Peoria Flood Response Plan

Flood Control District of Maricopa County
Engineering Division
Flood Warning Branch
2801 W Durango Street
Phoenix, AZ 85009
Phone: 602-506-1501
www.fcd.maricopa.gov

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DISCLAIMER

The user should read this entire Flood Response Plan (FRP) carefully and should be aware of all elements of this plan, including strengths and limitations, and individual responsibilities. This FRP is useful as one component in developing a flood warning system for the City of Peoria. However, the possibility of inadvertent error in design or failure of equipment to function exists and may prevent the system from performing perfectly at all times. Therefore, nothing contained herein may be construed as a guarantee of the system or its operation, or create any liability on the part of any party or its directors, officers, employees or agents for any damage that may be alleged to result from the operation, or failure to operate, the system or any of its component parts. This constitutes notice to any and all persons or parties that the National Weather Service, Flood Control District of Maricopa County, Maricopa Department of Emergency Management, Maricopa County Department of Transportation, Arizona Department of Transportation, Maricopa County Sheriff's Office, Maricopa County Parks and Recreation Department, City of Peoria Police Department, City of Peoria Fire Department, City of Peoria Public Works Department, City of Peoria Community Services Department, City of Peoria Engineering Department or any officer, agent or employee thereof, shall not be liable for any deaths, injuries, or damages of whatever kind that may result from reliance on the terms and conditions of this FRP.

This plan was produced by The Flood Control District of Maricopa County.

For matters regarding this plan:

Steve Waters, Flood Warning Branch Manager, Engineering Division
The Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona
Phone: (602) 506-1501
Fax (602) 506-4601
www.fcd.maricopa.gov

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TERMINOLOGY

Term	Definition
District	Flood Control District of Maricopa County
ALERT	Automated Local Evaluation in Real Time
FRP	Flood Response Plan
EAP	Emergency Action Plan
FEMA	Federal Emergency Management Agency
HAZUS	Hazard Mitigation Software from FEMA
CDMS	Comprehensive Data Management System (CDMS)
ESF	Emergency Support Function (City of Peoria EOP)
SRP	Salt River Project
MSP	Meteorological Services Program
CAP	Central Arizona Project

INTRODUCTION

The Flood Control District of Maricopa County (District) provides flood hazard identification, prevention, regulation and remediation to reduce the risk of injury, loss of life and property damage from flooding in the County. The purpose of this comprehensive Flood Response Plan (FRP) is to ultimately reduce the potential for property damage and loss of life resulting from floods within the City of Peoria (Peoria).

Project Need

Peoria is subject to future floods that can occur with little warning. Increased readiness measures and warning actions taken in advance of flooding are essential to safeguard lives and property. This FRP provides a means to coordinate the District's flood data collection and monitoring activities with the City's emergency response activities specific to flooding.

LOCATION

Peoria is a city in Maricopa County and Yavapai County in the state of Arizona. Most of the city is located in Maricopa County, while a small portion of the north is in Yavapai County. It is a major suburb of Phoenix (Figure 1).

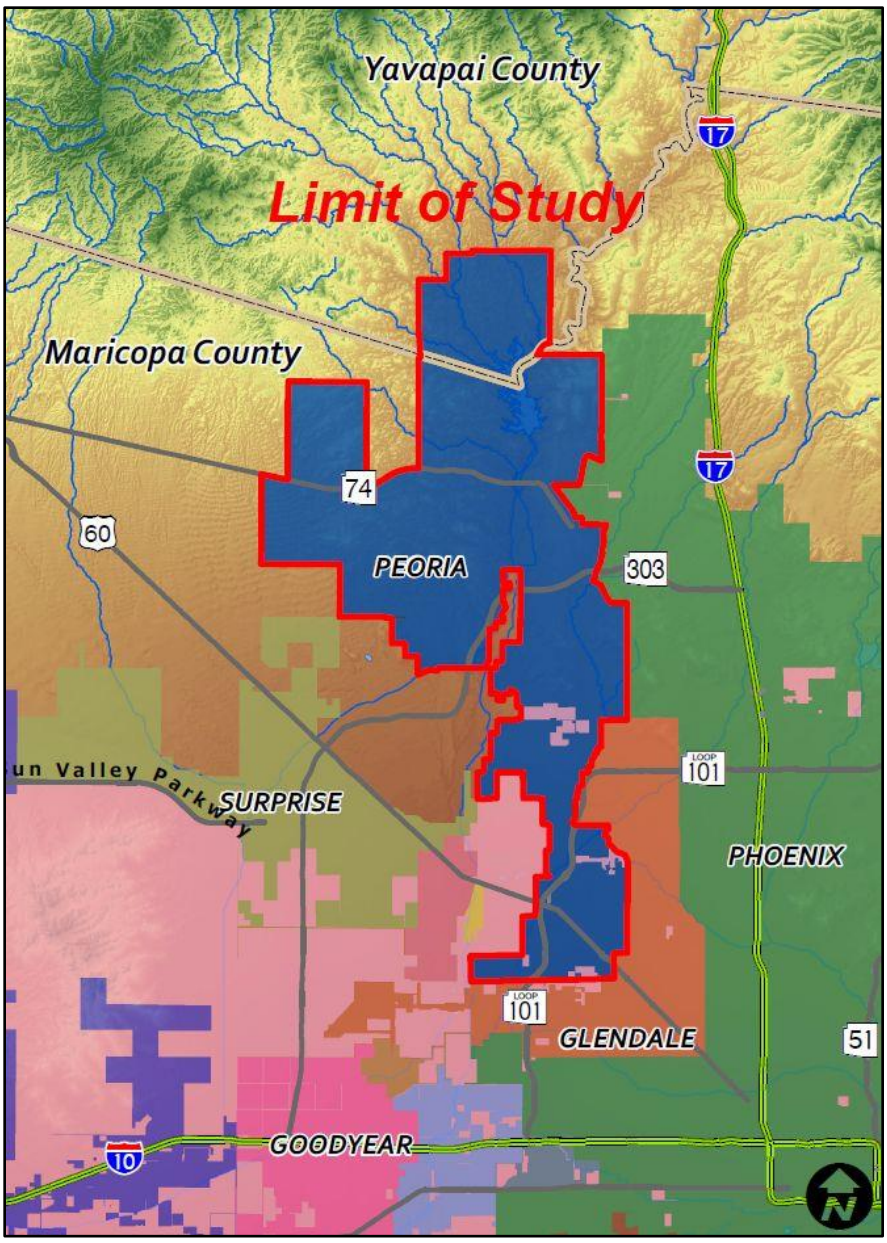


Figure 1 : City of Peoria Location Map

Description of Upstream Watershed

There are seven watersheds within the City of Peoria Boundary; Lower ACDC Watershed, Lower Agua Fria Watershed, Lower New River Watershed, Trilby Watershed, Upper ACDC Watershed, Upper Agua Fria Watershed and Upper New River Watershed (Figure 2).

Water generally flows in a north to south direction through the City of Peoria. There are two main watercourses that run through these watersheds, the Agua Fria River and New River. Agua Fria flows generally south from Prescott through Agua Fria National Monument then through a small canyon called

Black Canyon and into Lake Pleasant Regional Park. Lake Pleasant Regional Park lies in both Maricopa and Yavapai counties. This is a major recreational area with the 10,000 acre lake as the main attraction. New River originates northeast of the community of New River. The flow travels in a southwest direction under Interstate 17 and continues until it reaches New River Dam. At the outlet of New River Dam, the flow continues in a southerly direction. Skunk Creek flows into New River south of Bell Road and just west of Loop 101. New River flows into the Agua Fria River south of Glendale Avenue and continues south until it enters the Gila River.

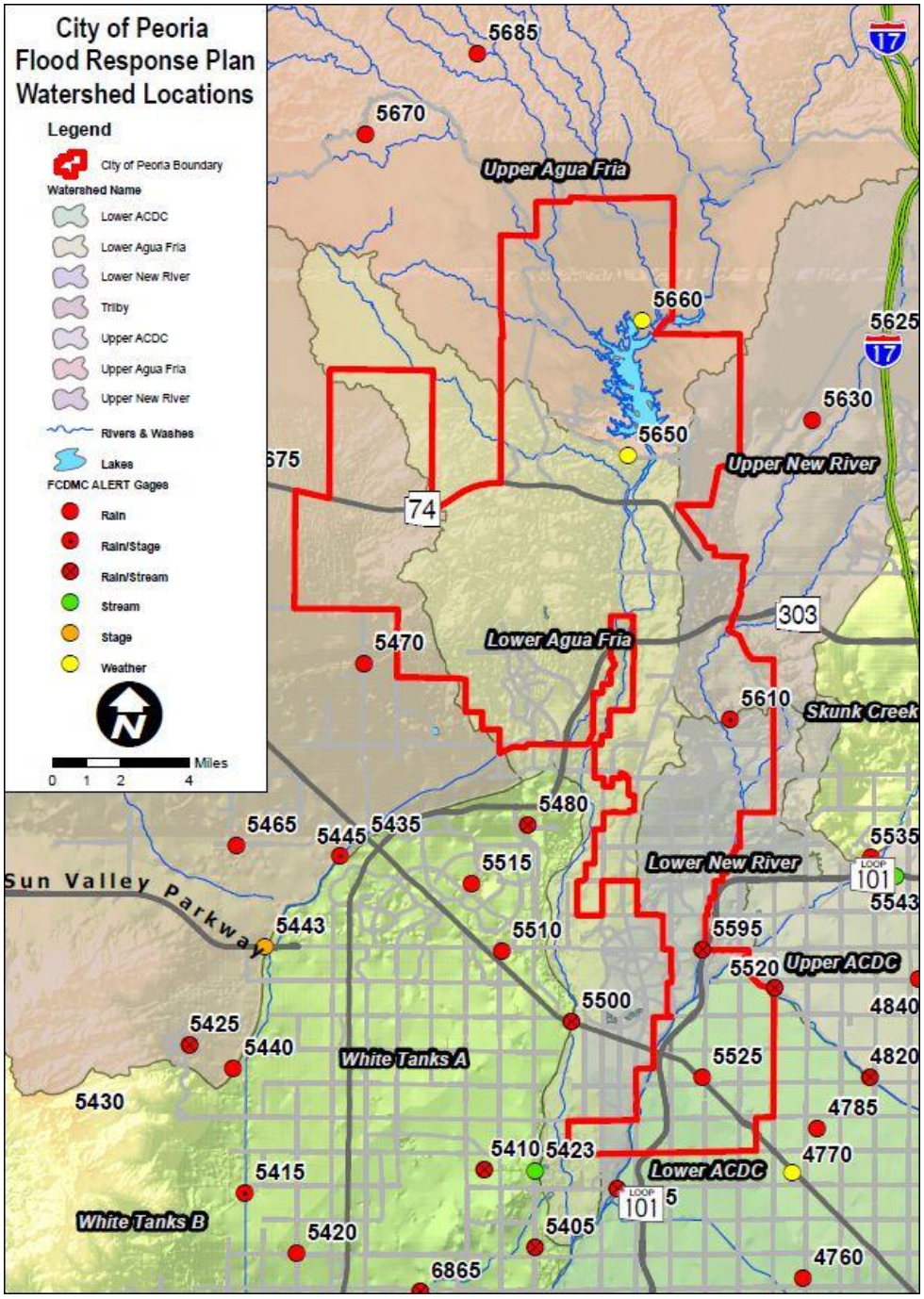


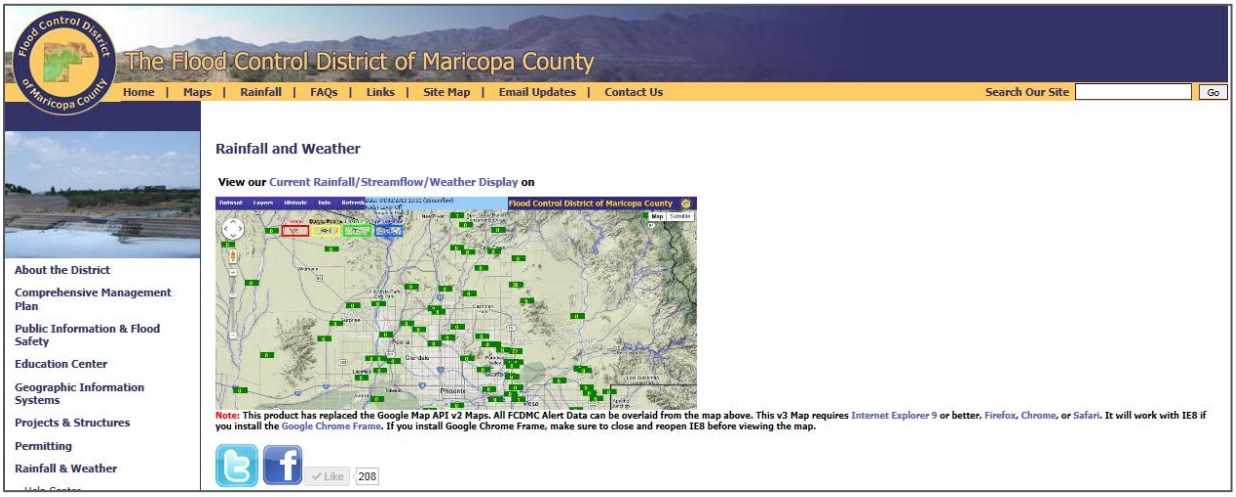
Figure 2 : Watershed Location Map

Involvement

This FRP will involve special coordination with Maricopa County Department of Emergency Management, Arizona Department of Transportation, Maricopa County Department of Transportation, Maricopa County Parks and Recreation Department, City of Peoria Fire Department, City of Peoria Police Department, City of Peoria Public Works Department, City of Peoria Community Services Department, City of Peoria Engineering Department and possibly other agencies and responders, as applicable.

FLOOD DECTECTION

The District provides early warning to agencies and responders through weather monitoring and an elaborate ALERT gauge network. The District's ALERT gauge network provides real-time data for rainfall, streamflow, water levels, and weather information 24 hours a day 365 days a year. All of this information is easily accessible via the District's website: http://www.fcd.maricopa.gov/Rainfall/rainfall.aspx.



Weather Monitoring

The District's in-house meteorologist monitors satellite data, radar data, National Weather Service (NWS) products and other tools to develop rainfall forecasts for the County. If requested, the forecasts are made available to local jurisdictions by fax or email notification. The forecasts are used as an early "heads up" for flood threat within the County.

In addition to the email, fax and telephone notifications for an impending flood threat, the District's meteorologist prepares and posts a Daily Weather Outlook each afternoon for the subsequent 24 hours, covering all Meteorological Services Program (MSP) Forecast Zones (Figure 3). The City of Peoria falls within three MSP Forecast Zones; Northwest Valley, New River/Cave Creek, and West Valley. The North Phoenix Zone runs parallel along Peoria's east city boundary and South Phoenix runs parallel along Peoria's south city boundary (See Figure 5).

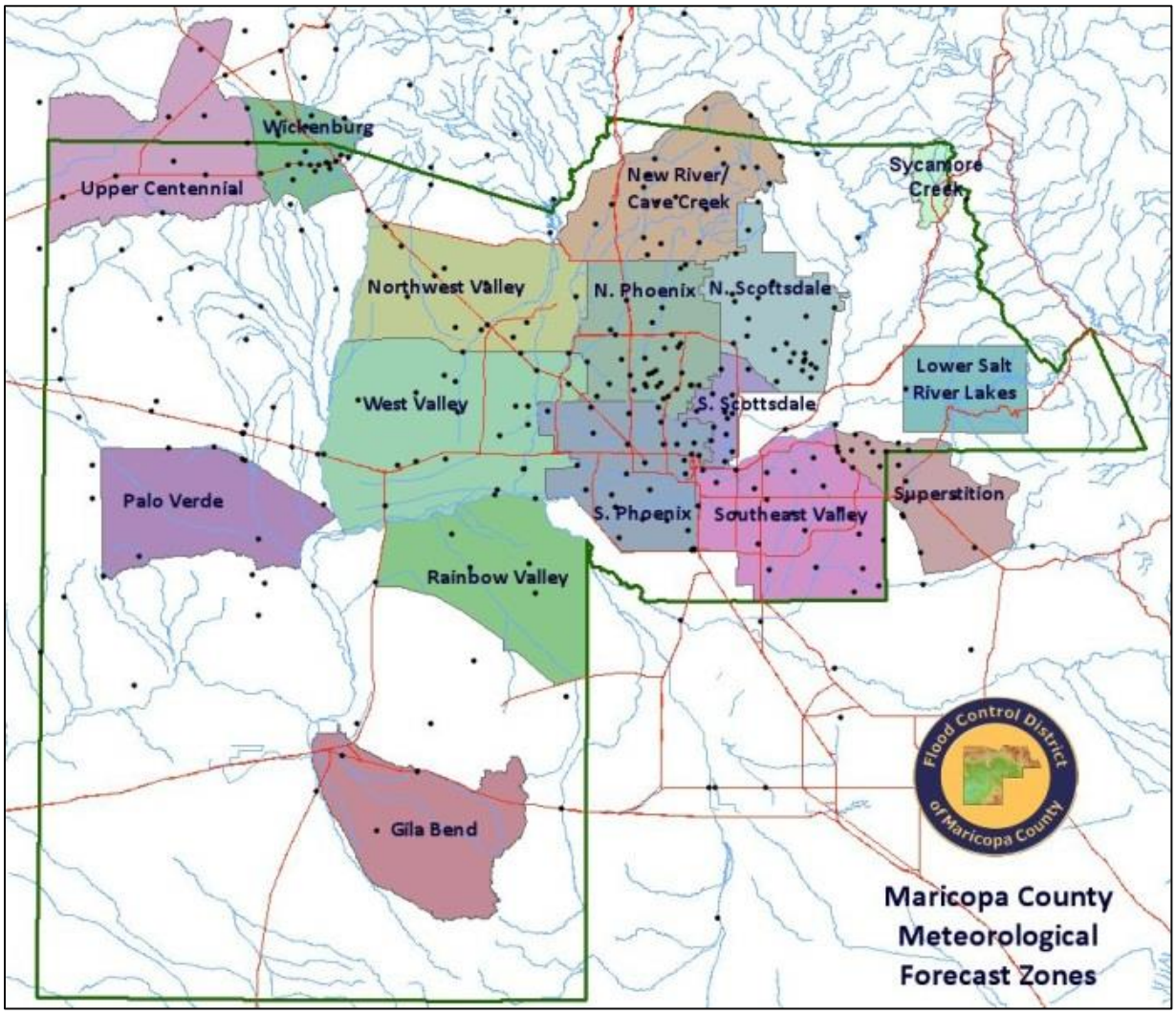


Figure 3 : Countywide MSP Forecast Zones Map

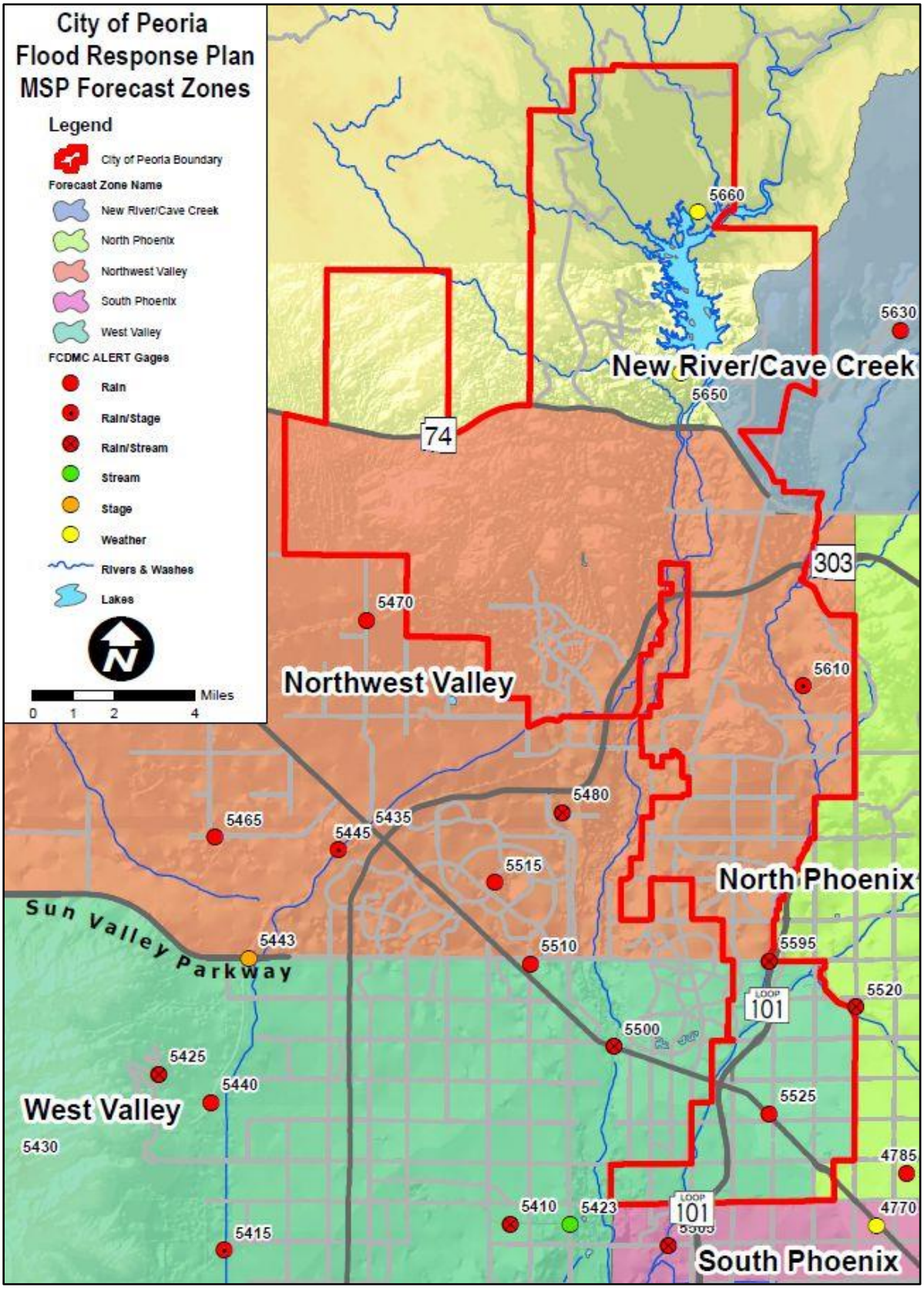


Figure 4 : City of Peoria MSP Forecast Zones Map

According to the District's MSP Standard Operating Procedure, if meteorological conditions warrant, the following messages are delivered for individual zones:

District Meteorological Services Program (MSP) Standard Operating Procedure:

Weather Outlook The Daily Outlook will be disseminated to all clients Monday through Friday (daily during monsoon season), between 1:00 pm and 1:30 pm. In addition, from about October 1 to July 1, a preliminary Outlook is issued around 8:00 am Monday thru Friday. Outlooks include synopsis of expected weather conditions for the remainder of the day, the coming night and the following morning. Expected weather trends for the following 2-3 days and expected wind conditions will also normally be included in the synopsis portion of the Outlook if time and space permits. The Outlook also includes the expected hours the bulk of the rain will fall, the probability of rain during this time and the amount of rain expected during this period.

Message 1 Developing weather conditions my lead to flooding and/or destructive winds. Lead times will generally be 1 to 3 hours in advance of the expected event. The alert will normally include the zones to be affected, the time frame of the expected event, and the type of areas that will be impacted- such as roads, washes, or streams.

Message 2 Developing weather event my lead to flash flooding. This message is similar to NWS Flood Watch. Lead time will generally be 1 to 2 hours in advance of the expected event.

Message 3 Flash flooding is imminent or occurring. This message is similar to a NWS Flood or Flash Flood Warning. Lead time will generally be less than an hour. The magnitude of flooding is variable – a Message 3 does not necessarily signify major flooding.

Message 4 ALL CLEAR. Event no longer poses a threat and previous messages have expired or have been cancelled.

Message 1, 2 & 3 Update These messages will update the existing Alert, Watch or Warning.

Lake Alerts In addition to the above MSP products, weather guidance is provided for Maricopa County lakes/reservoirs from June 15th through October 15th. Lake Alerts are issued as needed to inform of approaching adverse weather conditions. Emphasis in these statements is placed on expected wind gusts and lightning activity.

Track Forecast At times the depiction of expected thunderstorm movement may best be shown by a graphic, including location of the primary thunderstorms of concern, and a 1-hour forecast track of these storms.

Quantitative Precipitation Forecast (QPF) This graphical product may be issued when the forecaster believes he has a good grasp as to how much rain will fall, where it will fall and when it will fall (valid time).

ALERT Gauge Network Monitoring

The District monitors a sophisticated network of automatic rain gauges, stream gauges, and weather stations in and around Maricopa County. The network uses ALERT (Automated Local Evaluation in Real Time) technology to detect and monitor rainfall and runoff during storms. The system is monitored continuously (24/7) by using threshold alarm features available onsite or by remote notification and access.

Flood Control District of Maricopa County (FCDMC) Gauges

A complete list of ALERT gauges located in the City of Peoria, with their specific alarm values, are listed below in Table 1. Lists of ALERT gauges located near the border of Peoria and/or within contributing watersheds are listed below in Table 2. See Figure 5 for a map of the ALERT Gauge Locations.

ALERT Gauges within the City of Peoria					
Gauge Name	**Location**	**Owner**	**ID #**	**Type**	**Alarm Value**
Lake Pleasant North Weather Station	On Deer Island, north end of Lake Pleasant	FCDMC	5654	Peak Wind	N/A
			5657	Wind Speed/Dir	N/A
			5658	Dewpoint	N/A
			5660	Precip	0.5 in. \ 20 min
			5661	Humidity	N/A
			5662	Temperature	N/A
			5663	Solar Rad.	N/A
			5664	Pressure	N/A
			5667	Wind Direction	N/A
Lake Pleasant Weather Station	South end of Lake Pleasant	FCDMC	5646	Peak Wind	N/A
			5647	Wind Speed/Dir	N/A
			5648	Wind Dir	N/A
			5649	Pressure	N/A
			5650	Precip	0.5 in. \ 20 min
			5651	Humidity	N/A
			5652	Temperature	N/A
			5655	Dewpoint	N/A
New River Dam	1/2 mi. NE of Jomax Rd. and 83rd Ave.	FCDMC	5610	Precip	0.5 in. \ 20 min 1.25 in. \ 1 hr.
New River Outlet	1/2 mi. NE of Jomax Rd. and 83rd Ave.	FCDMC	5613	Stream PT	4.9 ft \244 cfs 12.0 ft.\3,000 cfs
New River Dam Pool	1/2 mi. NE of Jomax Rd. and 83rd Ave.	FCDMC	5614	Non-Subm PT	26.8 ft. \ 10% 52.0 ft. \ 50%
New River at Bell Rd.	Bell Rd. at 83rd Ave	FCDMC	5595	Precip	0.5 in. \ 20 min
			5598	Stream PT	2.0 ft. \ 1,366 cfs 2.91 ft. \ 2,643 cfs 4.18 ft. \ 4,860 cfs
Grand Ave. at Peoria Ave.	Intersection of Grand Ave. and Peoria Ave.	FCDMC	5525	Precip	0.5 in. \ 20 min

Table 1: ALERT Gauges within the City of Peoria

ALERT Gauges near the City of Peoria					
Gauge Name	**Location**	**Owner**	**ID #**	**Type**	**Alarm Value**
Agua Fria River near Rock Springs	3.8 miles SSW of Black Canyon City	USGS	09512 800	Precip & Stream	N/A
Columbia Hill	5 mi. NNW of Castle Hot Springs	FCDMC	5685	Precip	0.5 in. \ 20 min
Garfias Mountain	6 mi. WSW of Castle Hot Springs, off Castle Hot Springs Rd.	FCDMC	5670	Precip	0.5 in. \ 20 min
Sunup Ranch	1 mi. SSW of New River	FCDMC	5625	Precip	0.5 in. \ 20 min
New River Landfill	4 mi. ENE of New Waddell Dam	FCDMC	5630	Precip	0.5 in. \ 20 min
Picacho Wash @ SR 74	SR 74 at Cotton Lane alignment	FCDMC	5675	Precip	0.5 in. \ 20 min 1.25 in. \ 1 hr.
			5678	Stream PT	1.5 ft. \ 113 cfs 4.0 ft. \ 1,853 cfs 5.0 ft. \ 3,114 cfs
CAP @ 163rd Ave	CAP Canal at 163rd Ave.	FCDMC	5470	Precip	0.5 in. \ 20 min
McMicken Floodway	1.2 mi. N of Grand Ave. and Deer Valley Rd.	FCDMC	5435	Precip	0.5 in. \ 20 min 1.25 in. \ 1 hr.
El Mirage Drain	½ mile S of Pinnacle Peak and El Mirage Roads	FCDMC	5480	Precip	0.5 in. \ 20 min
			5483	Stream PT	3.45 ft. \ 617 cfs 5.0 ft. \ 1,170 cfs 6.0 ft. \ 1,673 cfs
Sun City West	¼ mi. SE of the Beardsley Rd. & Litchfield Rd. alignment	FCDMC	5515	Precip	0.5 in. \ 20 min
Dysart Rd. @ Bell Rd.	Dysart Rd. at Bell Rd.	FCDMC	5510	Precip	0.5 in. \ 20 min
Agua Fria R. Grand Ave.	Grand Ave. bridge at Agua Fria River	FCDMC	5500	Precip	0.5 in. \ 20 min
Dysart Drain @ Luke AFB	¼ mi. West of Northern Ave. & Litchfield Rd.	FCDMC	5410	Precip	0.5 in. \ 20 min 1.25 in. \ 1 hr.
			5413	Stream PT	2.0 ft. \ 205 cfs 7.0 ft. \ 2,113 cfs 8.2 ft. \ 2,858 cfs
Dysart Drain @ El Mirage Rd.	El Mirage Rd. at Glendale Ave.	FCDMC	5423	Stream PT	2.5 ft. \ 203 cfs 9.0 ft. \ 2,675 cfs 11.0 ft. \ 4,303cfs
City of Glendale	Grand Ave. at 63rd Ave.	FCDMC	4768	Solar Rad.	N/A
			4769	Pressure	N/A
			4770	Precip.	0.5 in. \ 20 min
			4772	Wind Dir.	N/A
			4773	Wind Speed/Dir.	N/A
			4774	Peak Wind	N/A
			5518	Dewpoint	N/A
			5521	Humidity	N/A
			5522	Temperature	N/A
Butler Park	¼ mile SE of 59th Ave. and Olive Ave.	FCDMC	4785	Precip	0.5 in. \ 20 min
Missouri Ave @16th St.	SW corner of Missouri & 16th St.	FCDMC	4820	Precip	0.5 in. \ 20 min
ACDC @ 67th Ave.	67th Ave. Bridge at Arizona Canal	FCDMC	5520	Precip	0.5 in. \ 20 min 1.25 in. \ 1 hr.
			5523	Stream PT	4.0 ft. \ 650 cfs 6.37 ft. \ 2,503 cfs 6.9 ft. \ 3,164 cfs

Table 2: ALERT Gauges near the City of Peoria

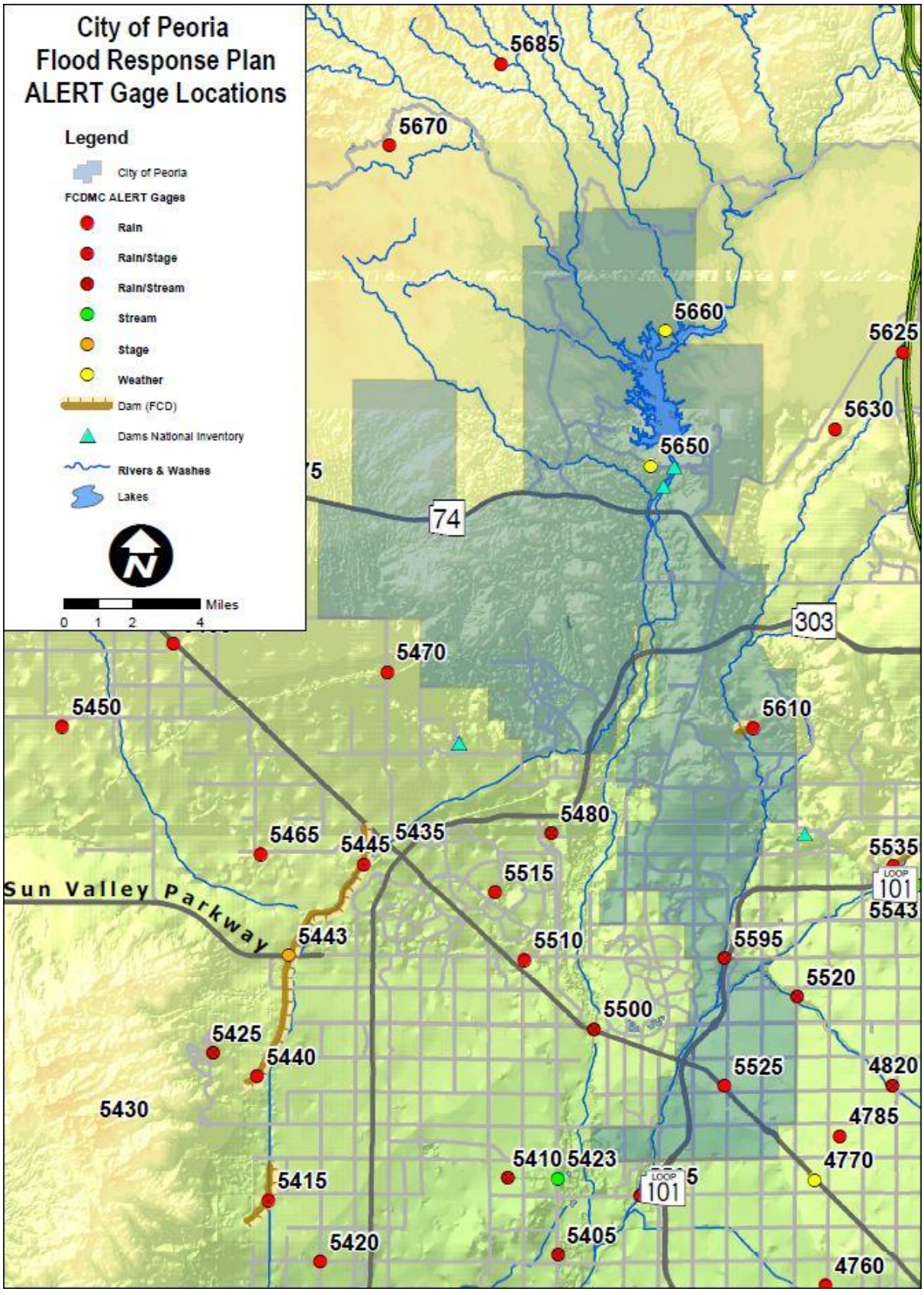


Figure 5 : Location of ALERT Gauges

Location of Essential Facilities

During a flood event it is important to know the location of your essential facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. The City of Peoria has three medical facilities, two police stations and eight fire stations within its city limits. One of the fire stations is located just west of New River on Jomax Road. During a large storm event this fire station will be greatly impacted. There may be a loss of access to the communities east of New River and/or West of Rock Springs Creek. See Figure 6 for a map of all the Police, Fire and Medical Locations.

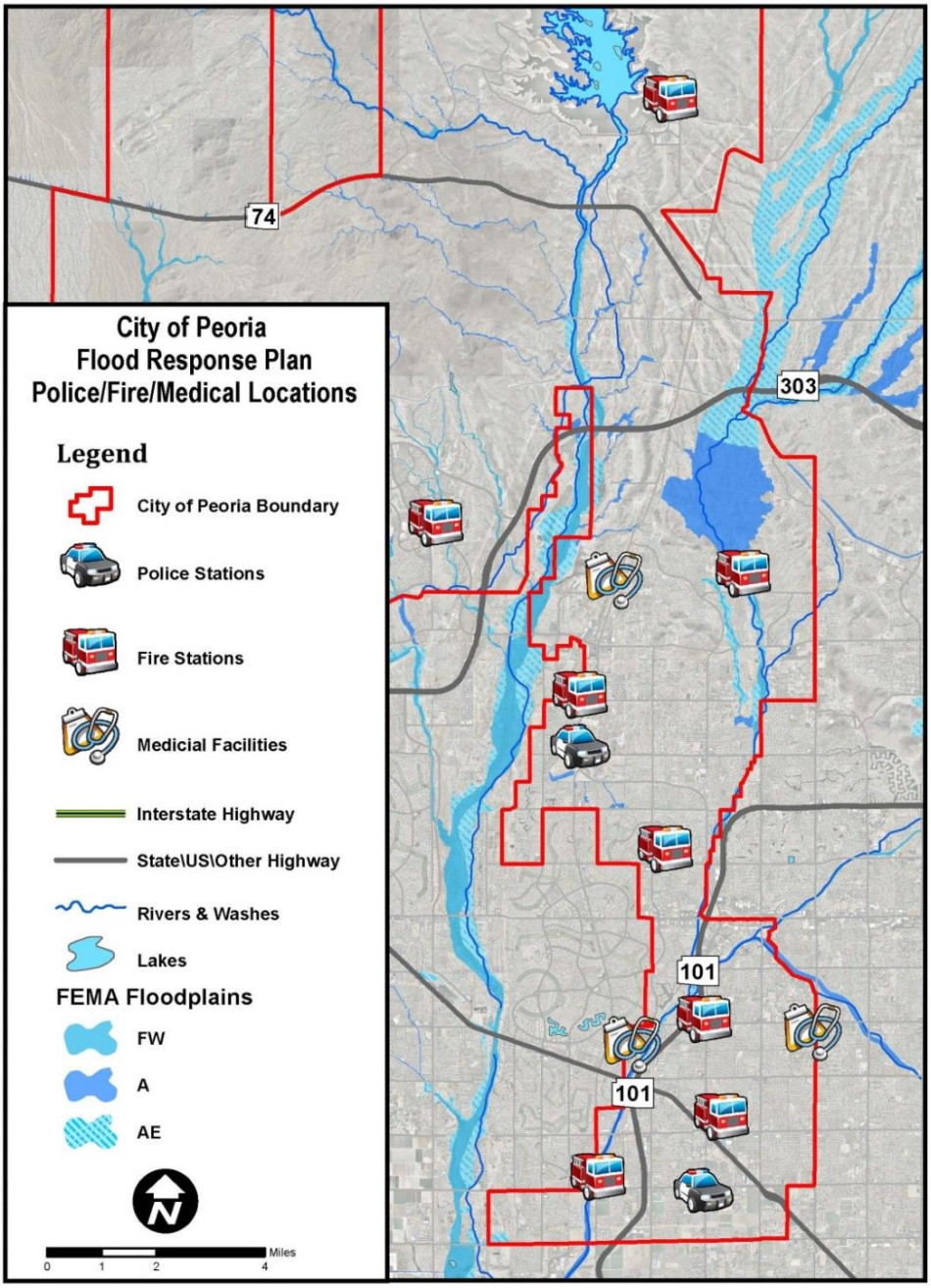


Figure 6: Police/Fire/Medical Locations

There are a total of seven high schools, twenty four elementary schools and twelve charter schools within the city limits of Peoria. There are a number of schools that are near floodplain boundaries. Many of these schools will not be affected by smaller flood events but evacuations may be necessary if the any dam Emergency Action Plan needs to be activated. Two schools, Peoria High School and Rio Vista Elementary School have recreation fields within a FEMA Flood Zone. See Figure 7 for all the school locations. **NOTE: The totals for all charter schools may change. This is the total computed during development of the PFRP.**

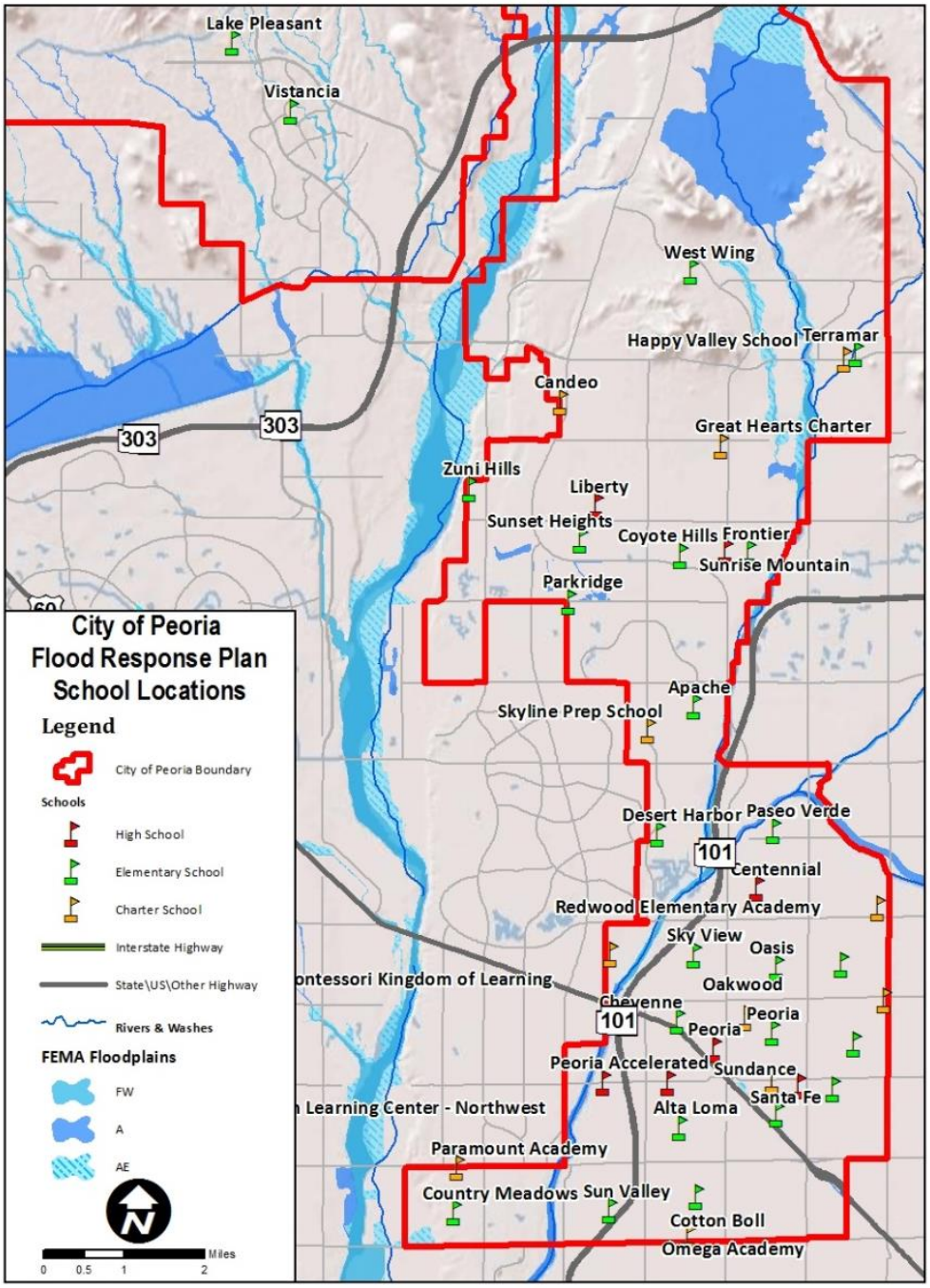


Figure 7: School Locations

Peoria Flood Response Plan Zones

For this FRP the City of Peoria has been divided into four different zones. These zones were created because of the diverse geography, multiple flooding sources, and the different rural and urban settings in Peoria. The North Zone is the area north of SR 74 which surrounds Lake Pleasant. The West Zone is the area south of SR 74, west of Agua Fria River and north of Jomax Road. The Central Zone is the area south of SR 74, east of Agua Fria River, west of 67th Avenue and north of Union Hills Drive. The South Zone is the area south of Union Hills Drive, west of 67th Avenue, and north of Northern Ave. Figure 8 below shows the boundaries of these zones.

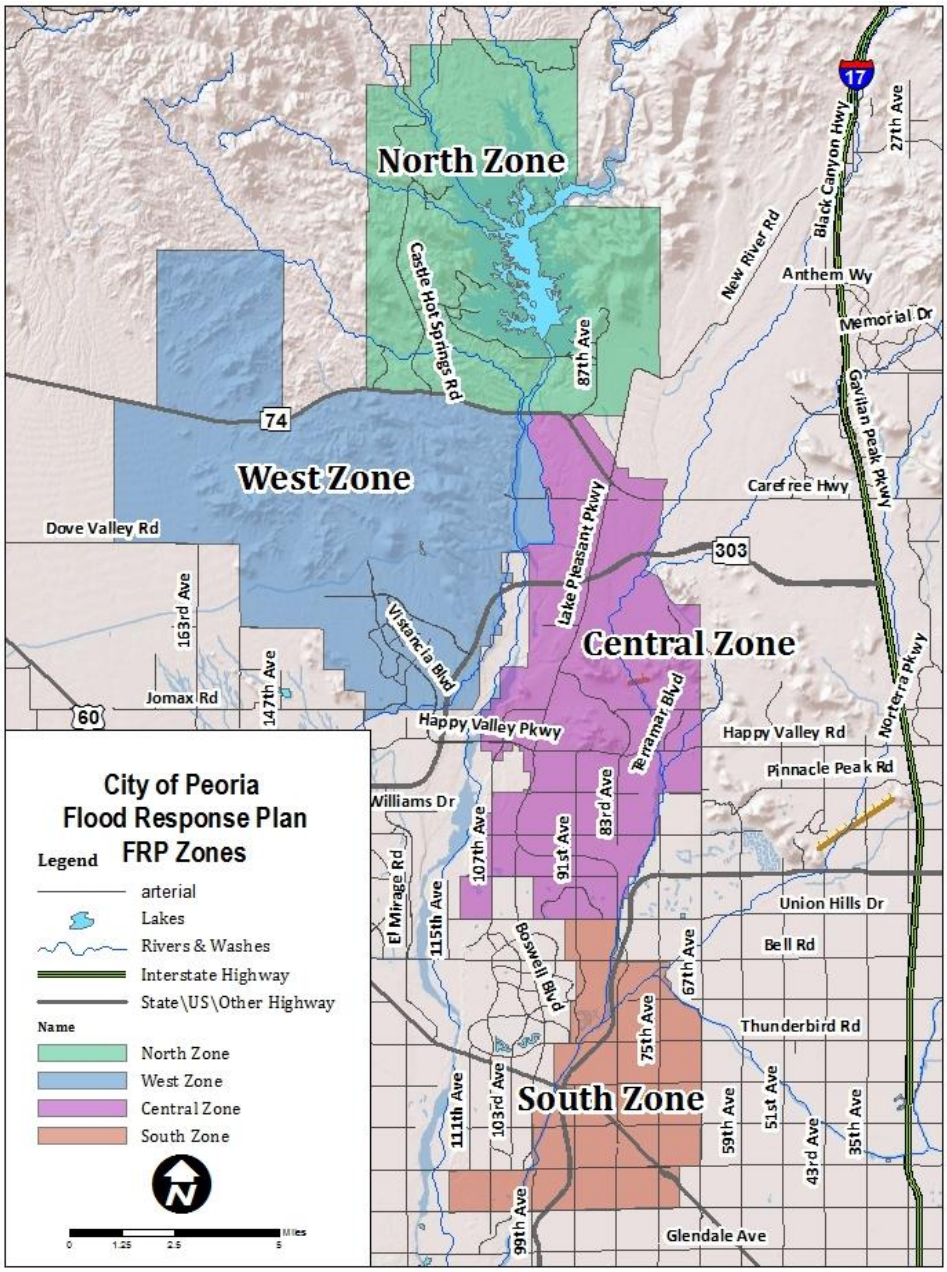


Figure 8: PFRP Zones

Other Data Sources

Many additional data sources are available online that help provide information about the weather and flooding conditions in Maricopa County and throughout Arizona. The District is a partner with Arizona Flood Warning System (http://www.afws.org). NWS issues meteorological and hydrological forecast and warnings to the public and to local jurisdictions (http://www.wrh.noaa.gov/psr). The Colorado Basin River Forecast Center (CBRFC) in Salt Lake City, Utah, prepares forecasts using computer-based river forecast models (http://www.cbrfc.noaa.gov). USGS also operates an elaborate network of rain and stream gauges (http://water.usgs.gov/) as well as Yavapai County http://weather.ycflood.com/. The District offers numerous products on our website and they are available 24/7.

A list of some of our products specific to Peoria are listed below:

- The Peoria Flood Response Plan Google Map is located at http://alert.fcd.maricopa.gov/alert/Google/v3/peoria.html. See Appendix G for the PFRP Google Map Standard Operating Procedure.
- The North Zone Flood Condition Map is located at http://alert.fcd.maricopa.gov/alert/Google/docs/PFRP_NorthZone.pdf.
- The West Zone Flood Condition Map is located at http://alert.fcd.maricopa.gov/alert/Google/docs/PFRP_WestZone.pdf.
- The Central Zone Flood Condition Map is located at http://alert.fcd.maricopa.gov/alert/Google/docs/PFRP_CentralZone.pdf.
- The South Zone Flood Condition Map is located at http://alert.fcd.maricopa.gov/alert/Google/docs/PFRP_SouthZone.pdf.

Dam Locations

There are 4 dams - Waddell Dam, New River Dam, Adobe Dam and Cave Buttes Dam that could potentially impact Peoria. Two of these dams, New Waddell Dam and New River Dam, are located within the city boundary of Peoria. Two additional Dams, Adobe Dam and Cave Buttes Dam are not within the city boundary but have spillway and evacuation areas that would affect Peoria. All of these Dams have Emergency Action Plans that will be implemented if a spillway flow or dam break is imminent and/or occurring. The triggers for either of these situations are included within the flowcharts for this FRP.

New Waddell Dam is located about 1.3 miles north of SR74 and 7 miles west of Interstate 17 (Figure 9). It is owned and operated by Central Arizona Project (CAP) and is an earth embankment dam. It dams the Agua Fria River to create Lake Pleasant. It has a maximum height of 430 feet and is approximately 4,700 feet long. The crest is 35 feet wide on which a 30 foot wide asphaltic concrete road is located. The crest elevation is at elevation 1728. The top of the active conservation use zone is at elevation 1702. Lake Pleasant contains approximately 849,625 acre-feet of water when the reservoir is at elevation 1702 and has an approximate surface area of 9,957 acres. New Waddell Dam provides the primary storage reservoir for the Central Arizona Project (CAP).

New River Dam is located about 4.5 miles downstream of Carefree Highway and 6 miles west of Interstate 17 (Figure 9). The main embankment is a compacted, multi-zoned, earthfill structure 2,320 feet in length with a maximum height of 104 feet above the streambed. The reservoir impoundment area has an area of approximately 1,780 acres and a gross capacity of 43,520 ac-ft at the spillway crest. The drainage area of New River to the dam is about 164 square miles. The Flood Control District of Maricopa County operates and maintains the flood control features of the dam. This dam provides flood and erosion protection for the highly developed areas downstream

Adobe Dam is located on Skunk Creek along Deer Valley Road in north Phoenix, north of SR 101 and west of Interstate 17 (Figure 9). The main embankment is a compacted, multi-zoned, earthfill structure 11,220 feet in length with a maximum height of 83.09 feet. The reservoir impoundment area has an area of approximately 1,320 acres and a gross capacity of 18,350 ac-ft at the emergency spillway crest. The drainage area of Skunk Creek to the dam is about 90 square miles. The Flood Control District of Maricopa County operates and maintains the flood control features of the dam. This dam provides flood and erosion protection for the highly developed areas downstream.

Cave Buttes Dam is located on Cave Creek in north Phoenix, approximately one half mile downstream from the old Cave Creek Dam, west of Cave Creek Road about three miles north of Loop 101 (Figure 9). The main embankment is a compacted, multi-zoned, earthfill structure 2,260 feet in length with a maximum height of 109 feet above the streambed. The reservoir impoundment area has an area of approximately 1,820 acres and a capacity of 46,600 ac-ft at the spillway crest. The drainage area of Cave Creek to the dam is about 191 square miles. The Flood Control District of Maricopa County operates and

maintains the flood control features of the dam. This dam provides flood and erosion protection for the highly developed areas downstream.

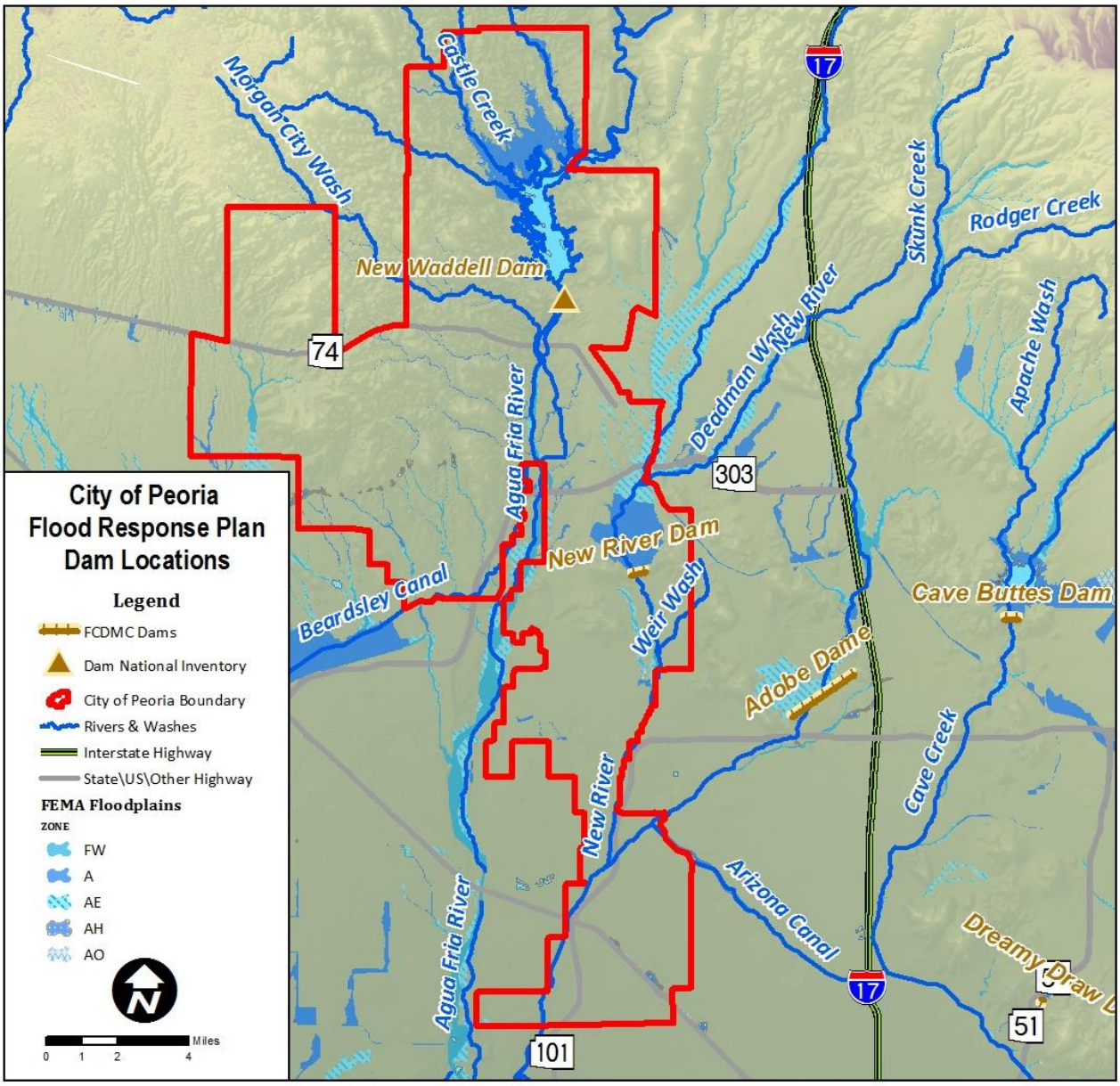


Figure 9: Dam Locations

Available Lead Times

Early flood detection is one of the most important aspects to being able to provide an early warning to communities and their residents. When a threshold value has been met at a sensor the District's ALERT software sets off an alarm. The alarm alerts an operator to a hazardous condition. By monitoring the streamgauges the District is able to estimate travel times from when the water is at the gauge to when it will reach a particular road crossing. Certain road crossings are more vulnerable to flooding and need to be barricaded during an event to prevent injury, property damage or loss of life. The following table's present calculated travel times for selected discharge values along the major streams in the study area.

Travel Times for New River

Flow from New River Dam Outlet is estimated using ALERT gauge #5613. The discharge and velocity from this gauge are estimated using FEMA FIS (Table 3). If a spillway flow is imminent or occurring, West Whitehorn Trail will need to be barricaded and the four homes just west of the crossing will need to be evacuated. Please refer to the flowcharts in the Emergency Action Section of this FRP. Tables from the New River EAP for spillway discharge are included below. For any spillway concerns please refer to the New River Dam EAP.

New River Dam Outlet #5613				
100-Year				
Location (miles downstream)	**Discharge (cfs)**	**Velocity (ft./sec)**	**Gauge Height (feet)**	**Time (minutes)**
Jomax Rd. (0.75 mi.)	2,300	4-9	10.81	10
Happy Valley Rd (1.8 mi.)	2,300	5-6	10.81	29
Structures New River (2.8 mi.)	2,300	6-8	10.81	36
Deer Valley Road (3.8 mi.)	2,300	3-10	10.81	46
Bell Road (7.0 mi.)	2,300	2-15	10.81	103

New River Dam Spillway Discharge			
Full Emergency Spillway Discharge (33,000 cfs)			
Location	**Depth (feet)**	**Velocity (ft./sec)**	**Time (mins)**
Whitehorn Trail			0
Jomax Rd.	6-15	8-25	15
Deer Valley Road	2-10	2-10	90
Bell Road	2-12	3-15	144
2/3 Emergency Spillway Discharge (23,000 cfs)			
Location	**Depth (feet)**	**Velocity (ft./sec)**	**Time (mins)**
Whitehorn Trail			0
Jomax Rd.	5-10	5-25	15
Deer Valley Road	2-10	2-10	90
Bell Road	2-12	2-12	144
1/3 Emergency Spillway Discharge (13,000 cfs)			
Location	**Depth (feet)**	**Velocity (ft./sec)**	**Time (mins)**
Whitehorn Trail			0
Jomax Rd.	4-8	5-20	24
Deer Valley Road	1-9	2-10	90
Bell Road	1-8	2-8	144

Table 3 : Travel Times for New River

Travel Times for Rock Springs Creek

Rock Springs Creek is a tributary to New River. There is currently no streamgauge located along this wash. There are 11 structures in the FEMA regulated floodplain. The headwaters to this wash originate northwest of Jomax Road and the limit to the FEMA FIS is at the eastern edge of the West Wing subdivision. The travel times for this wash have been estimated using the Rock Springs Creek FIS from Stantec Consulting Inc. FCD 98-47 (Table 4). This flow rate does not account for any spillway flow from New River Dam.

Rock Springs Wash (Tributary to New River)			
Location	**Discharge (cfs)**	**Velocity (ft./sec)**	**Time (minutes)**
Jomax Road (0.4 mi)	1300	3-5	9
Happy Valley Road (1.4 mi.)	1000	3-4	34
Pinnacle Peak (2.4 mi.)	1200	4	50

Table 4 : Travel Times for Rock Springs

Travel Times for Arizona Canal

The Arizona Canal flows in a southeast to northwest direction until it reaches Skunk Creek. This flow does not originate in the City of Peoria but it is important to watch these gauges and the travel times because it is a large contributor to Skunk Creek and eventually New River. There are a series of stream gauges along ACDC as well as staff gauges on bridges. There is a stream gauge located near 43rd Ave and Peoria Ave called ACDC @ 43rd Ave #4820 and another stream gauge located near 67th Ave and Greenway #5520. Both Skunk Creek and New River have road crossings and recreational trails along them. The flow frequency for the ACDC for these travel times are based on HECWRC implementation of Bulletin 17B, n=22, 1992-2012. A list of multiple peak flow values can be found on the FCDMC Summary Statistic and Complete Records for Each Water-Level Station page in the Streamflow and Storage Information page on the District's website.

Arizona Canal Diversion Channel 100 - year				
Location	**Discharge (cfs)**	**Velocity (ft./sec)**	**Gauge Height (ft)**	**Time (min)**
ACDC at 67th Ave (3.8 mi. from ACDC @ 43rd Ave.)	4,950	3-4	8.1	95
At Skunk Creek (5.2 mi.)	4,950	3-4	8.1	130
10-year				
Location	**Discharge (cfs)**	**Velocity (ft./sec)**	**Gauge Height (ft)**	**Time (min)**
ACDC at 67th Ave (3.8 mi. from ACDC @ 43rd Ave.)	2,420	2-3	6.3	133
At Skunk Creek (5.2 mi.)	2,420	2-3	6.3	183

Table 5 : Travel Times for Arizona Canal

Travel Times for Agua Fria River

Flow from the Agua Fria River through Peoria originates from Waddell Dam. Lake Pleasant water is released into the Beardsley Canal, Waddell Canal and the CAP canal. There is a gauge on the dam maintained by CAP that can be monitored. The Waddell Dam data can be viewed at http://www.cap-az.com/index.php/departments/water-operations/lake-pleasant. This page will display the Water Surface Elevation, Storage Volume (arc-ft), Percent Full, Surface Area (acres), Plant Pumping(=)/Releasing(-) Flow (cfs), River Outlet Works Flow (cfs) and the Lower Lake Elevation. Figure 10 shows a screenshot of all the data available for the New Waddell gauge.

Figure 10: Waddell Dam Data Screenshot

The information in Table 6 below are approximate depths, discharge values and travel times to reach various locations if there was a failure of the dam during the probable maximum flood. These values are from the City of Peoria EOP page 207. They can also be found in the New Waddell Dam EAP in Table 1 on page 37.

New Waddell Dam			
Location	**Depth (feet)**	**Maximum Flow (cfs)**	**Time (hours)**
Sun City	59	7,107,000	1.5
Thomas Road	38	5,402,000	3.25
Avondale	44	4,760,000	3.75
Liberty	44	4,073,000	5.5
Buckeye	59	3,630,000	6.5
Bruner Road	59	2,976,000	7.5
Gillespie Dam	62	2,322,000	8.75
Painted Rock Reservoir	39	2,187,000	10.5

Table 6 : Travel Times for Agua Fria River

Travel Times for Adobe Dam

Adobe Dam Outlet flows are estimated using ALERT gauge #5538 and Scatter Wash flows are estimated using ALERT gauge #5543. These are both stream gauges that contribute to Skunk Creek. The tables below show approximate depths, velocities and times to reach various locations if Adobe Dam were to fail. These flows are not taking into account the flows from Scatter Wash that may be contributing to Skunk Creek. Scatter Wash flow enters Skunk Creek west of 43rd Avenue and South of Loop 101. The values in Table 7 are from the City of Peoria EOP pg.205. If the potential for a dam breach is imminent or occurring refer to the Adobe Dam EAP. The values in Table 8 are from the Adobe Dam EAP page 27.

Adobe Dam Travel Time per Peoria EOP			
Location	**Depth (feet)**	**Velocity (ft./sec)**	**Time (hours)**
Below Dam	>20	10-15	--
59th Avenue/Union Hills Drive	20	10-15	1.5-1.75
Bell Road	>15	10-15	2-2.25
Grand Avenue	>15	10-15	4-4.5
Glendale Avenue	>15	10-15	4.5-5

Table 7 : Travel Times for Adobe Dam per Peoria EOP

Adobe Dam Travel Time			
Location	**Depth (feet)**	**Velocity (ft./sec)**	**Time (hours)**
Loop 101	6-20	5-15	<0.25
Arizona Canal	2-15	3-12	2-3
US 60 / Grand Avenue	2-20	3-15	4
Agua Fria River	2-15	3-12	5

Table 8: Travel Time for Adobe Dam per Adobe Dam EAP

FLOOD THREAT RECOGNITION

This section of the FRP will define major roadway crossings, minor roadway crossings and locations of specific flood vulnerability that are subject to 100 year flood hazard. Many roadways, pedestrian/bike trails and recreation areas that are within Peoria are susceptible to flooding. There are particular road crossings noted within this FRP that are vulnerable to dangerous flooding. At any point in a storm event road crossings may become impassable and alternative routes may need to be taken by pedestrians, residents, and emergency vehicles to access a particular crossing. Some of the crossings are low flow pedestrian/bike paths and some are along major roadways. These crossings on major roadways need to be barricaded in a timely manner to prevent motorists from trying to cross the wash. The responsibility of maintaining, monitoring and barricading these roads lies in the road owner. Specific tasks are detailed in the Emergency Response Actions section of this FRP.

Major Roadway Crossings

Major roadway crossings are defined as road crossings that have a combination of being highly travelled, have a high discharge (cubic feet per second) value or have a high velocity (feet per second) value. High flows in these watercourses can make particular crossings very dangerous during a flood event. Locations of major roadways that are vulnerable to flooding are identified in Table 9. The Average Daily Traffic (ADT) count was provided by the City of Peoria. The ADT Count Data is from 2011 and the discharge below was estimated using FEMA Flood Insurance Studies. For the PFRP a major roadway has been defined as any road that has an ADT greater than 3,000 total cars per day.

Major Roadway Crossings							
Zone	**Crossing**	**River/Wash Name**	**Type of Crossing**	**Owner**	**ADT**	**Design Capacity**	**FEMA Discharge (Q)**
North	**SR74**	Agua Fria River	Bridge	ADOT	4,132 Total 1,971 WB 2,161 EB	15,000 cfs	100yr=9,000cfs 500yr=46,500cfs
North	**SR74**	Beardsley Canal	Bridge	ADOT	4,132 Total 1,971 WB 2,161 EB	N/A	N/A
North	**SR74**	CAP Canal	Bridge	ADOT	4,132 Total 1,971 WB 2,161 EB	N/A	N/A
West	**SR74**	Padelford Wash Tributary A	Culvert	ADOT	3,419 Total 1,691 WB 1,728 EB	N/A	100yr = 1,163cfs
West	**SR 74**	Padelford Wash Tributary B	Culvert	ADOT	3,419 Total 1,691 WB 1,728 EB	N/A	100yr = 1,571cfs
West	**SR74**	Padelford Wash Tributary C West	Culvert	ADOT	3,216Total 1,568 WB 1,648 EB	N/A	N/A
West	**SR74**	Padelford Wash Tributary C East	Culvert	ADOT	3,216Total 1,568 WB 1,648 EB	N/A	N/A

Major Roadway Crossings							
Zone	**Crossing**	**River/Wash Name**	**Type of Crossing**	**Owner**	**ADT**	**Design Capacity**	**FEMA Discharge (Q)**
West	**SR74**	Unnamed Wash No.2	Culvert	ADOT	3,216Total 1,568 WB 1,648 EB	N/A	N/A
West	**SR74**	Wash Tributary 2	Culvert	ADOT	3,216Total 1,568 WB 1,648 EB	N/A	N/A
West	**Loop 303 Southbound**	Caterpillar Tank Wash	Bridge	ADOT	7,500 Total	Q500=2,340cfs	100yr = 1,375cfs
West	**Loop 303 Northbound**	Caterpillar Tank Wash	Bridge	ADOT	7,500 Total	Q500=2,340cfs	100yr = 1,375cfs
West	**Loop 303 Southbound**	Beardsley Canal South	Bridge	ADOT	7,500 Total	N/A	N/A
West	**Loop 303 Northbound**	Beardsley Canal South	Bridge	ADOT	7,500 Total	N/A	N/A
West	**Loop 303 Southbound**	Beardsley Canal North	Bridge	ADOT	7,500 Total	N/A	N/A
West	**Loop 303 Northbound**	Beardsley Canal North	Bridge	ADOT	7,500 Total	N/A	N/A
West	**Vistancia Boulevard**	Beardsley Canal	Bridge	Peoria	13,201 Total 6,540 SB 6,661 NB		N/A
West	**Vistancia Boulevard**	Unnamed Wash	Box Culvert	Peoria	13,201 Total 6,540 SB 6,661 NB		N/A
West	**Vistancia Boulevard Northbound**	Twin Buttes Wash	Bridge	Peoria	6,661 Total	3,196cfs Design	100yr = 2,779cfs
West	**Vistancia Boulevard Southbound**	Twin Buttes Wash	Bridge	Peoria	6,540 Total	3,196cfs Design	100yr = 2,779cfs
West	**Vistancia Boulevard**	White Peak Wash	Bridge	Peoria	3,539 Total 1,765 SB 1,774 NB	1,426cfs Design	100yr = 721cfs
West	**Lone Mountain Parkway**	Caterpillar Tank Wash	Culvert	Peoria	3,099 Total 1,222 WB 1,877 EB		100yr = 1,375cfs
West	**Lone Mountain Parkway**	Twin Buttes Wash	Culvert	Peoria	3,099 Total 1,222 WB 1,877 EB	100yr = 2424cfs	100yr = 2424cfs
West	**Lone Mountain Parkway**	Peoria's Wash "B"	Bridge	Peoria	3,099 Total 1,222 WB 1,877 EB		
West	**Lone Mountain Parkway**	Unnamed Wash	Culvert	Peoria	3,099 Total 1,222 WB 1,877 EB		
South	**Bell Road**	New River	Bridge	Peoria	63,381 Total 31,904 WB 31,477 EB		10yr = 2,700cfs 50yr = 8,000cfs 100yr = 12,000cfs
South	**75th Avenue**	Skunk Creek	Bridge	Peoria	20,517 Total 10,589 SB 9,928 NB		10yr = 2,200cfs 50yr = 6,700cfs 100yr = 11,000cfs 500yr = 3,3000
South	**Paradise Lane**	Skunk Creek	Bridge	Peoria	6,731 Total 3,272 WB 3,459 EB		10yr = 2,200cfs 50yr = 6,700cfs 100yr = 11,000cfs 500yr = 33,000cfs

Major Roadway Crossings							
Zone	**Crossing**	**River/Wash Name**	**Type of Crossing**	**Owner**	**ADT**	**Design Capacity**	**FEMA Discharge (Q)**
South	**75th Avenue**	Arizona Canal Diversion Channel	Bridge	Peoria	20,517 Total 10,589 SB 9,928 NB		100yr = 4,950cfs
South	**83rd Avenue**	Skunk Creek	Bridge	MCDOT	17,955 Total 9,310 SB 8,645 NB	N/A	100yr =35,000cfs 50yr =18,000cfs 10yr = 6,600cfs Qspf =55,000cfs
South	**Loop 101**	Skunk Creek	Bridge	ADOT	103,132 Total	Q100=35,000cfs	100yr =35,000cfs 50yr =18,000cfs 10yr = 6,600cfs Qspf =55,000cfs
South	**Thunderbird Road**	New River	Bridge	Peoria	30,295 Total 15,050 WB 15,245 EB	24,000cfs Design	10yr = 13500cfs 50yr = 31000cfs 100yr = 41000cfs 500yr = 75,000cfs
South	**US 60**	New River	Bridge	ADOT	37,945 Total 18,923 WB 19,022 EB	Q100=41,000cfs Qspf=68,000cfs	100yr=41,000cfs Qspf=68,000cfs
South	**US60**	BNSF RR Zone AH	Underpass, Bridge & At-Grade	ADOT	37,945 Total 18,923 WB 19,022 EB	N/A	N/A
South	**Peoria Avenue**	New River	Bridge	Peoria	17,141 Total 8,333 WB 8,808 EB	38,000cfs 50 yr Design	100yr=41,000cfs Qspf=68,000cfs
South	**Olive Avenue**	New River	Bridge	MCDOT	28,848 Total 14,281 WB 14,567 EB	55,000cfs 100yr Design	100yr=41,000cfs Qspf=68,000cfs
South	**Northern Avenue**	New River	Bridge	Peoria	24,255 Total 12,017 WB 12,238 EB	Q100=42,800cfs Qspf=73,700cfs	100yr=41,000cfs Qspf=68,000cfs
Central	**SR74**	New River West Tributary 20	Culvert	ADOT	3,216Total 1,568 WB 1,648 EB	N/A	N/A
Central	**SR74**	New River West Split	Culvert	ADOT	3,216Total 1,568 WB 1,648 EB	N/A	N/A
Central	**Lake Pleasant Parkway**	Unnamed Wash 9	Culvert	Peoria	3,706 Total 1,838 NB 1,868 SB		100yr =359cfs
Central	**Lake Pleasant Parkway**	CAP Canal	Bridge	MCDOT	3,706 Total 1,838 NB 1,868 SB		N/A
Central	**Lake Pleasant Parkway**	New River West Tributary 5	At-Grade	MCDOT	3,706 Total 1,838 NB 1,868 SB		100yr=483cfs
Central	**Lake Pleasant Parkway**	New River West Tributary 10	At-Grade	MCDOT	3,706 Total 1,838 NB 1,868 SB		100yr=258cfs
Central	**Loop 303 Westbound**	New River	Bridge	ADOT	7,500 Total	Q500=60,860cfs	100yr=53,000cfs Qspf=76,000cfs
Central	**Loop 303 Eastbound**	New River	Bridge	ADOT	7,500 Total	Q500=60,860cfs	100yr=53,000cfs Qspf=76,000cfs
Central	**Loop 303 Westbound**	Agua Fria River	Bridge	ADOT	7,500 Total	Q100=25,000 Q500=42,500	100yr=9,000cfs 500yr=46,500cfs

Major Roadway Crossings							
Zone	**Crossing**	**River/Wash Name**	**Type of Crossing**	**Owner**	**ADT**	**Design Capacity**	**FEMA Discharge (Q)**
Central	**Loop 303 Eastbound**	Agua Fria River	Bridge	ADOT	7,500 Total	Q100=25,000 Q500=42,500	100yr=9,000cfs 500yr=46,500cfs
Central	**Loop 303 Westbound**	New River West Tributary 16/CAP Canal	Bridge	ADOT	7,500 Total	N/A	N/A
Central	**Loop 303 Eastbound**	New River West Tributary 16/CAP Canal	Bridge	ADOT	7,500 Total	N/A	N/A
Central	**Loop 303**	Tributary 1	Culvert	ADOT	7,500 Total	N/A	N/A
Central	**Loop 303**	New River West Tributary 5	Culvert	ADOT	7,500 Total	N/A	N/A
Central	**Jomax Road**	Rock Springs Wash	Culvert	Peoria	3,814 Total 1,874 WB 1,940 EB		100yr = 1200cfs
Central	**Jomax Road**	New River	Culvert	Peoria	3,814 Total 1,874 WB 1,940 EB	1,600cfs Design	100yr = 1700cfs 50yr = 2200cfs 100yr=2350cfs
Central	**Happy Valley Road**	Rock Springs Wash	Culvert	Peoria	17,379 Total 8,556 WB 8,823 EB	972cfs Design	100yr = 1200cfs
Central	**Happy Valley Road**	New River	Bridge	Peoria	17,379 Total 8,556 WB 8,823 EB		100yr = 1700cfs 50yr = 2200cfs 100yr=2350cfs
Central	**Happy Valley Road**	Agua Fria River	Bridge	MCDOT	29,461 Total 14,992 WB 14,469 EB	28,993cfs 100yr Design 54,985cfs 500yr Design	100yr=9,000cfs 500yr=46,500cfs
Central	**107th Avenue**	Happy Valley Wash	Culvert	Peoria	7,366 Total 3,414 NB 3,952 SB		N/A
Central	**Deer Valley Road**	New River	Bridge	MCDOT	25,479 Total 12,626 WB 12,853 EB	7,910cfs 100 yr Design	10yr = 2400cfs 50yr = 6500cfs 100yr = 9800cfs
Central	**Beardsley Road**	New River	Bridge	Peoria	17,675 Total 8,944 WB 8,731 EB		100yr = 12,000cfs
Central	**Union Hills Drive**	New River	Bridge	Peoria	30,228 Total 15,189 WB 15,039 EB		100yr = 12,000cfs

Table 9: Major Roadway Crossings

Minor Roadway Crossings

Minor roadway crossings are defined as road crossings that have a decreased level of traffic compared to a major roadway. These roads can still have high discharge (cubic feet per second) values and/or high velocity (feet per second) values. They are at-grade crossings that pose a very real danger to motorists (an at-grade crossing is defined as a point on the roadway that is periodically inundated by moving floodwaters). Locations of minor roadways that are vulnerable to flooding are identified in Table 10. For the PFRP a minor roadway has been defined as any road that has an ADT of less than 3,000 total cars per day. The discharge values in the table below were estimated using FEMA Flood Insurance Studies.

Minor Road Crossings

Zone	Crossing	River/Wash Name	Type of Crossing	Owner	ADT	FEMA Discharge (Q)
North	**Two Shoes Ranch Road**	Humbug Creek	At-Grade	MCDOT	N/A	N/A
North	**Castle Hot Springs Road**	Castle Creek	Bridge	MCDOT	N/A	N/A
North	**Cottonwood Lane**	Cottonwood Creek	Bridge	MCDOT	N/A	N/A
North	**Castle Hot Springs Road**	Tributary M-12	Culvert	Peoria	N/A	100yr=1,239cfs
North	**Lake Pleasant (Park) Entrance Road**	Tributary M-12	Culvert	MCDOT	N/A	100yr=1,239cfs
North	**Castle Hot Springs Road**	Tributary M-11	Culvert	Peoria	309 Total 146 SB 163 NB	100yr = 803
North	**Castle Hot Spring Road**	Morgan City Wash	Bridge	Peoria	309 Total 146 SB 163 NB	100yr = 13,900cfs
North	**Cow Creek Road/ French Creek Road**	West Castle Creek	At-Grade	MCDOT	N/A	N/A
North	**Castle Hot Springs Road**	Cottonwood Creek	Culvert	Peoria	N/A	N/A
North	**Lake Pleasant Bypass Road**	Morgan City Wash	At-Grade	MCDOT	N/A	100yr = 14,400cfs
North	**Hank Raymond Maricopa Trail Road**	Beardsley Canal	Bridge	MCDOT	N/A	N/A
West	**Old Carefree Highway**	Aqua Fria River	At-Grade	Peoria	N/A	100yr=9,000cfs
West	**Old Carefree Highway**	Unnamed Wash 5	At-Grade	Peoria	N/A	N/A
West	**Lone Mountain Parkway**	17 East (McMicken Wash)	Culvert	Peoria	822 Total 411 SB 411 NB	100yr=1,375cfs
West	**Lone Mountain Parkway**	White Peak Wash	Culvert	Peoria	2,894 Total 1,421 WB 1,473 EB	100yr = 395cfs
West	**Blackstone Drive**	West Garambullo Wash	Culvert	Peoria	N/A	100yr = 483cfs
West	**Blackstone Drive**	East Garambullo Wash	Culvert	Peoria	N/A	100yr = 259cfs
West	**Sunrise Point**	Twin Buttes Wash	Culvert	Peoria	N/A	100yr = 395cfs
West	**Blackstone Drive**	Twin Buttes Wash	Culvert	Peoria	N/A	100yr = 395cfs
West	**Via Caballo Blanco**	Twin Buttes Wash	Culvert	Peoria	N/A	100yr = 395cfs
West	**Westland Road**	White Peak Wash	Culvert	Peoria	307 Total 123 WB 184 EB	100yr = 395cfs
West	**Westland Road**	West Fork White Peak Wash	Culvert	Peoria	307 Total 123 WB 184 EB	100yr = 294cfs

Minor Road Crossings						
Zone	**Crossing**	**River/Wash Name**	**Type of Crossing**	**Owner**	**ADT**	**FEMA Discharge (Q)**
West	**Westland Road**	Twin Buttes Wash	Culvert	Peoria	307 Total 123 WB 184 EB	100yr = 2424cfs
West	**Sunrise Point**	White Peak Wash	Bridge	Peoria	1,597 Total 822 SB 775 NB	100yr = 721cfs
West	**Sunset Point**	White Peak Wash	Bridge	Peoria	1,189 Total 584 WB 605 EB	100yr = 721cfs
West	**Sunset Point**	Twin Buttes Wash	Bridge	Peoria	1189 Total 584 WB 605 EB	100yr = 2424cfs
West	**Ridgeline Road**	White Peak Wash	Bridge	Peoria	N/A	100yr = 721cfs
West	**Ridgeline Road**	Twin Buttes Wash	Bridge	Peoria	N/A	100yr = 2,424cfs
West	**Ridgeline Road**	Wash B	Culvert	Peoria	N/A	N/A
West	**Claret Cup Road**	16 East (McMicken Wash)	Culvert	Peoria	N/A	N/A
West	**Claret Cup Road**	16 East Wash Tributary	Culvert	Peoria	N/A	N/A
West	**Eagle Trail**	16 East (McMicken Wash)	Culvert	Peoria	N/A	N/A
West	**130th Drive**	16 East (McMicken Wash) Tributary	Culvert	Peoria	N/A	N/A
West	**Jomax Road**	Twin Buttes Wash	At-Grade	Peoria	N/A	100yr = 2424cfs
West	**Jomax Road/Beardsley Canal**	16 East (McMicken Wash)	Bridge	Peoria	N/A	N/A
West	**Jomax Road**	Agua Fria River	At-Grade	Peoria	N/A	100yr=9,000cfs
South	**Edwards Street**	BNSF RR AH Zone	At-Grade	Peoria	N/A	N/A
South	**Stone Street**	BNSF RR AH Zone	At-Grade	Peoria	N/A	N/A
South	**Market Street**	BNSF RR AE Zone	At-Grade	Peoria	N/A	N/A
South	**Gold Dust Avenue**	BNSF RR AO Zone	At-Grade	Peoria	N/A	N/A
South	**79th Avenue**	BNSF RR AO Zone	At-Grade	Peoria	N/A	N/A
South	**Mountain View Road**	BNSF RR AO Zone	At-Grade	Peoria	N/A	N/A
South	**Vogel Avenue**	BNSF RR AH Zone	At-Grade	Peoria	N/A	N/A
South	**Carol Avenue**	BNSF RR AH Zone	At-Grade	Peoria	N/A	N/A
South	**Hatcher Road**	BNSF RR AH Zone	At-Grade	Peoria	N/A	N/A
South	**75th Avenue**	BNSF RR AH Zone	At-Grade	Peoria	N/A	N/A
South	**Olive Avenue**	BNSF RR AH Zone	At-Grade	Peoria	N/A	N/A
South	**Eva Street**	BNSF RR AH Zone	At-Grade	Peoria	N/A	N/A
South	**Sana Street**	BNSF RR AH Zone	At-Grade	Peoria	N/A	N/A
South	**Mission Lane**	BNSF RR AH Zone	At-Grade	Peoria	N/A	N/A
South	**75th Drive**	BNSF RR AH Zone	At-Grade	Peoria	N/A	N/A
South	**76th Drive**	BNSF RR AH Zone	At-Grade	Peoria	N/A	N/A
South	**Betty Drive**	BNSF RR AH Zone	At-Grade	Peoria	N/A	N/A
South	**Major**	AE Zone	At-Grade	Peoria	N/A	N/A
South	**Northern Ave**	AE Zone	At-Grade	Peoria	N/A	N/A
Central	**Old Carefree Highway**	Beardsley Canal	Flume Bridge	Peoria	N/A	N/A
Central	**Old Carefree Highway**	Waddell Canal	Bridge	Peoria	N/A	N/A
Central	**Old Carefree Highway**	New River West Trib 5	At-Grade	Peoria	N/A	100yr=483cfs
Central	**Old Carefree Highway**	New River West Trib 10	At-Grade	Peoria	N/A	100yr=258cfs
Central	**Old Carefree Highway**	New River West Trib 20	At-Grade	Peoria	N/A	N/A
Central	**Dixileta Drive**	Unnamed Wash 8	At-Grade	Peoria	N/A	N/A
Central	**Whitehorn Trail West**	New River Dam Spillway West	Culvert	Peoria	N/A	N/A

Minor Road Crossings						
Zone	**Crossing**	**River/Wash Name**	**Type of Crossing**	**Owner**	**ADT**	**FEMA Discharge (Q)**
Central	**Whitehorn Trail East**	New River Dam Spillway East	Culvert	Peoria	N/A	N/A
Central	**Peay Drive (Artemisa Avenue)**	Rock Springs Wash	At-Grade	Peoria	N/A	100yr = 1200cfs
Central	**78th Avenue**	Rock Springs Wash	At-Grade	Peoria	N/A	100yr = 1200cfs
Central	**Calle Lejos**	Rock Springs Wash	Culvert	Peoria	848 Total 409 WB 439 EB	100yr = 1200cfs
Central	**79th Avenue**	Rock Springs Wash	At-Grade	Peoria	N/A	100yr = 1200cfs
Central	**Avenida Del Sol**	Rock Springs Wash	At-Grade	Peoria	N/A	100yr = 1200cfs
Central	**Camino De Oro**	Rock Springs Wash	At-Grade	Peoria	N/A	100yr = 1200cfs
Central	**77th Avenue**	Rock Springs Wash	At-Grade	Peoria	N/A	100yr = 1200cfs
Central	**Pinnacle Peak Road**	Rock Springs Wash	At-Grade	Peoria	689 Total 348 WB 341 EB	100yr = 1200cfs
Central	**Agua Fria River Truck Route**	Agua Fria River	At-Grade	Peoria	N/A	100yr=9,000cfs 500yr=46,500cfs

Table 10: Minor Roadway Crossings

There are a total of eighteen minor road crossing that have been removed from the FEMA regulated floodplain by LOMR-APP's. Seventeen of these roadways where located in the Tierra Del Rio North Subdivision. One of these roadways was located in Unnamed Wash 9 which was and AE Zone. The road crossings are listed in the Table 11 below and the LOMR'S are in Appendix D.

Minor Road Crossings Removed by LOMR-APP's						
Zone	**Crossing**	**River/Wash Name**	**Type of Crossing**	**Owner**	**LOMR Case No.**	**FEMA Discharge (Q)**
Central	**White Feather Ln**	Unnamed Wash 9	At-Grade	Peoria	13-09-0215P	N/A
Central	**Blue Sky Drive**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A
Central	**Oberlin Way**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A
Central	**Gambit Trail**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A
Central	**102nd Drive**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A
Central	**Hedge Hog Place**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A
Central	**Bent Tree Drive**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A
Central	**Pinnacle Vista Drive**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A
Central	**Fetlock Trail**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A
Central	**Buckhorn Trail**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A
Central	**N 103rd Lane**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A
Central	**Rosewood Lane**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A
Central	**Alyssa Lane**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A
Central	**104th Lane**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A
Central	**Bajada Road**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A
Central	**Redbird Road**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A
Central	**104th Lane**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A
Central	**104th Drive**	AE Zone	At-Grade	Peoria	13-09-0216P	N/A

Table 11: Minor Roadways Crossings Removed by LOMR's

Locations of Special Flood Vulnerability

There are other areas of concern besides roadways within Peoria. A list of specific areas of flood vulnerability within Peoria is presented in Table 12. All of these locations are also displayed in Figures 7-10. **Note: These may not be every location of flood vulnerability during a large flood event. The locations that have been identified are all along FEMA Regulated Floodplains.**

Location of Special Flood Vulnerability		
Zone	**Location**	**Concern**
North	**Floating Bridge over Pipeline Canyon Trail**	There is a Floating Bridge located on Pipeline Canyon Trail in Lake Pleasant Region Park. Pipeline Canyon Trail crosses Pipeline Canyon Wash. This area will need to be monitored during a flood event.
North	**Maricopa County Trail**	The Maricopa Trail will eventually link the county's ten parks and provide miles of hiking, mountain biking and equestrian trails. There are two sections located in the PFRP North Zone: the Maricopa Trail Open and Maricopa Trail Future after 2016.
North	**Lake Pleasant Regional Park**	The park offers many activities, such as camping, boating, fishing, swimming, hiking, picnicking, and wildlife viewing. Maricopa County Parks & Recreation Department and Maricopa County Sherriff's office will need to monitor the Lake Pleasant Lake Alerts issued by FCDMC and pass information along to boaters, hikers and others who may need it.
West	**Blackstone Golf Course**	Blackstone Golf Course is part of Blackstone Country Club which is located in the community of Vistancia. This golf course has some golf cart paths and greens that are within White Peak Wash, West Garambullo Wash, East Garambullo Wash and Garambullo Wash. The at-grade golf cart crossings and greens will need to be monitored during a flood event.
West	**Trilogy Golf Course**	Trilogy Golf Course is located in the community of Vistancia. This course has some golf cart paths and greens that are within 16 East (McMicken Wash). The at-grade golf cart crossings and greens will need to be monitored during a flood event.
West	**Maricopa County Trail**	The Maricopa Trail will eventually link the county's ten parks and provide miles of hiking, mountain biking and equestrian trails. There is one section of the Maricopa Trail that is within the PFRP West Zone which is Future Maricopa County Trail.
West	**Community Trails**	Vistancia is a planned community located in the PFRP West Zone. There are 3.5 miles of trails that are used for biking and walking. These trails follow Twin Buttes Wash and White Peak Wash. These trails cross a FEMA Floodway and will need to be monitored in the event of a flood.
Central	**Pleasant Valley Airport**	Pleasant Valley Airport is located west of Lake Pleasant Parkway and north of Old Carefree Highway. New River West Tributary 5 and New River West Tributary 10 cross the runway. During an event the runway will need to be monitored and the Airport will need to respond accordingly.
Central	**Parkridge 4 Subdivision Recreation Fields**	Parkridge 4 subdivision is located south of Lake Pleasant Parkway between 99th Avenue and 95th Avenue. This subdivision has recreational field that are within a FEMA Flood Zone A. This area will need to be monitored in the event of a flood.
Central	**Maricopa County Trail**	The Maricopa Trail will eventually link the county's ten parks and provide miles of hiking, mountain biking and equestrian trails.
South	**Pedestrian Bridge over New River**	There is a pedestrian bridge that connects Rio Vista Park and the Sun Circle Maricopa Trail to Harbor View Subdivision. This bridge crosses New River just south on the confluence with Skunk Creek. This area will need to be monitored in the event of a flood.
South	**Peoria High School**	Peoria High School is located along US 60 in-between 87th Avenue and 83rd Avenue. The recreation fields (football, baseball and softball) are located in a FEMA Flood Zone AH. This area will need to be monitored during a flood event.
South	**Rio Vista Park Recreation Fields**	Rio Vista Park is located just west of Loop 101 and north of Thunderbird Road. New River runs along the west side of the park. A recreation field and parking lot are located in a FEMA Flood Zone AE. This area will need to be monitored during a flood event.
South	**Santa Fe Elementary School Recreation Fields**	Santa Fe Elementary School is located along US 60 in-between 79th Avenue and 77th Avenue. The recreation fields are located in a FEMA Flood Zone AO. This area will need to be monitored during a flood event.

Table 12: Locations of Special Flood Vulnerability

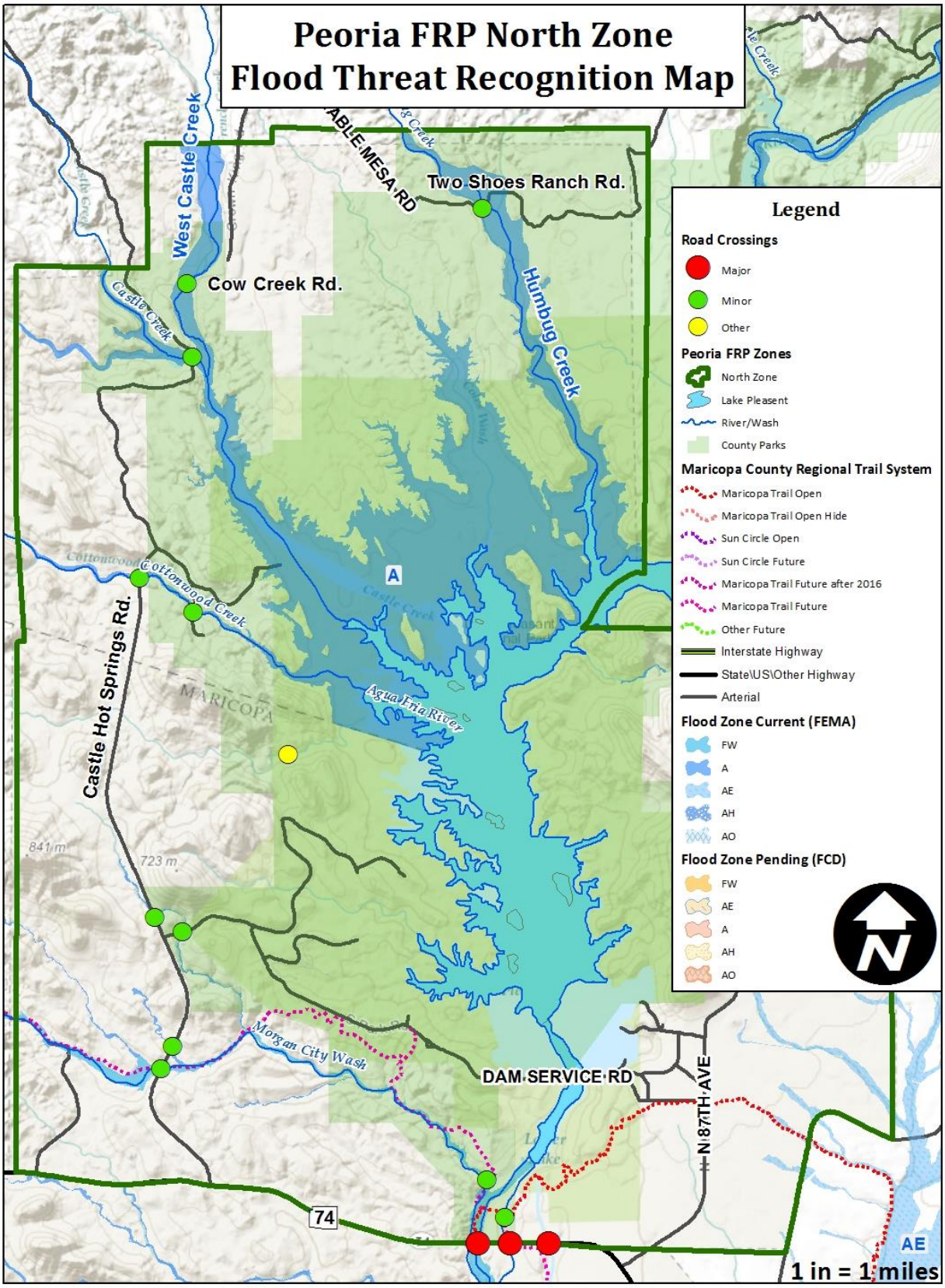


Figure 11: PFRP North Zone Flood Threat Recognition Map

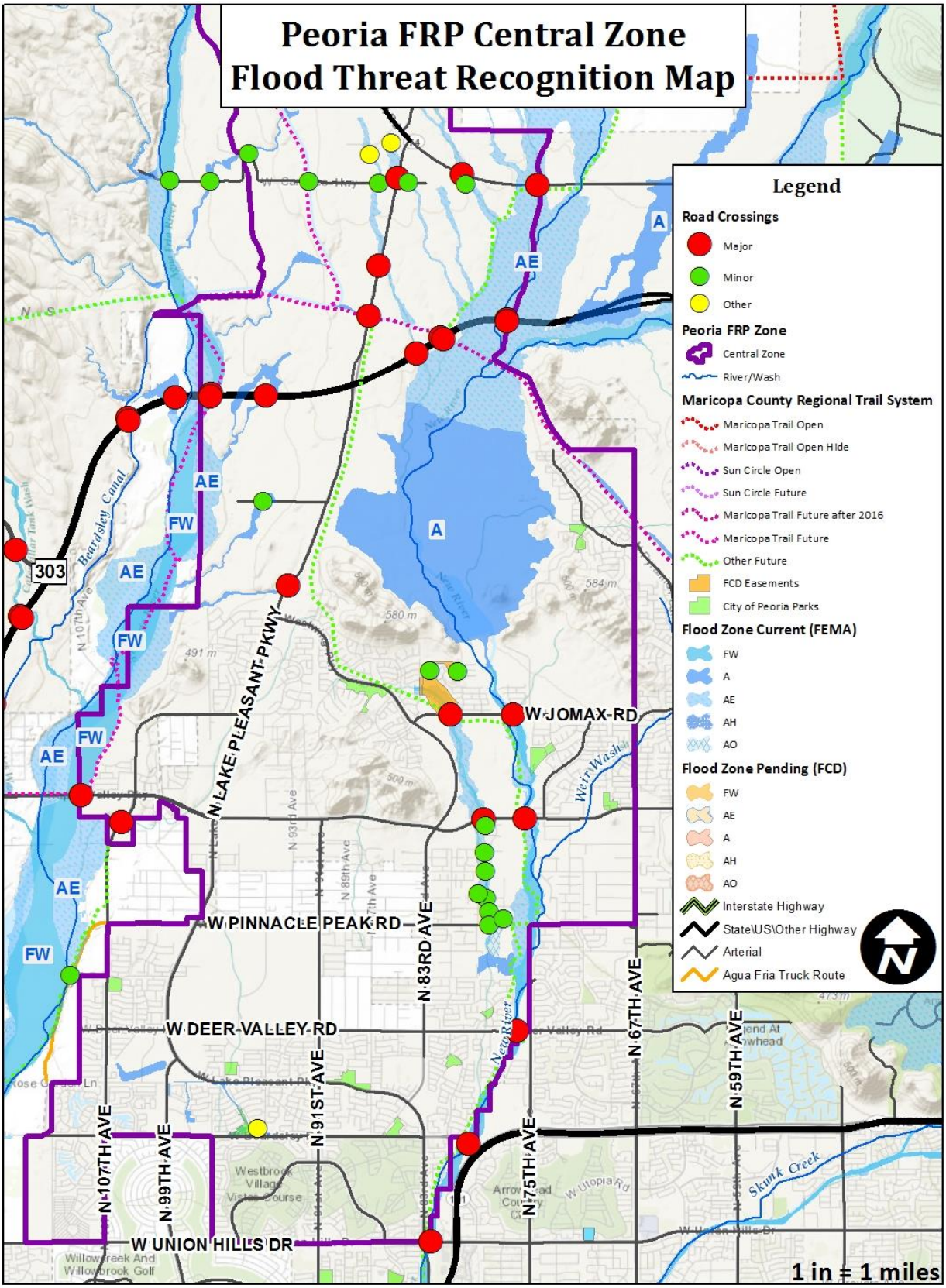


Figure 12: PFRP Central Zone Flood Threat Recognition Map

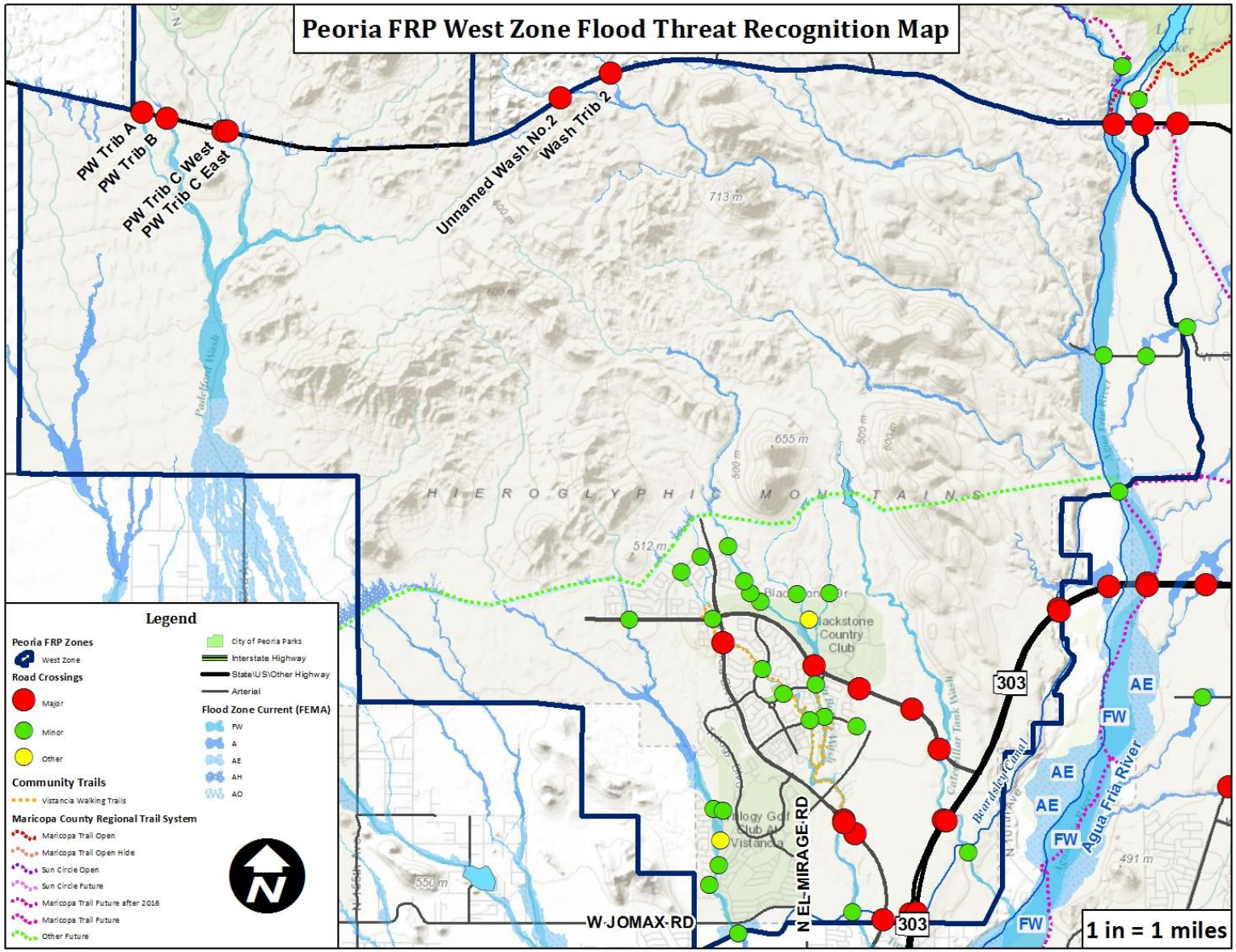


Figure 13: PFRP West Zone Flood Threat Recognition Map

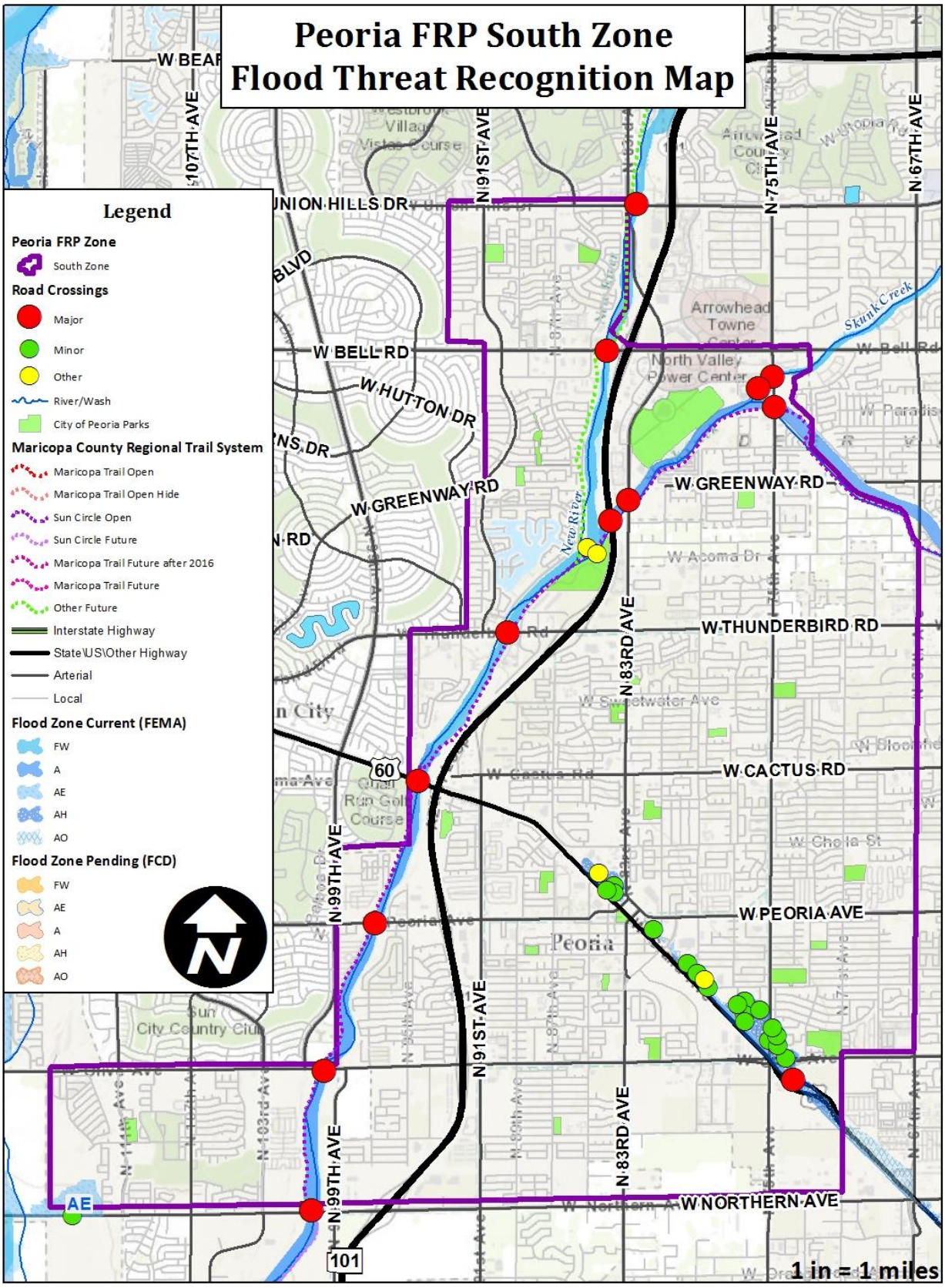


Figure 14: PFRP South Zone Flood Threat Recognition Map

Structures at Risk within FEMA Flood Hazard Zone

There are a total of ninety nine structures within the City of Peoria that are located within a FEMA designated Flood Hazard Zone. These flood zones are geographic areas that FEMA has defined according to varying levels of flood risks. Each Zone reflects a severity or type of flooding in the area. For this FRP, all the structures within the High Risk Areas, including Zones AE and A1-A30, Zone AH, and Zone AO, have been documented because in these areas mandatory flood insurance purchase requirements apply. Below is a table with the definitions of the FEMA Zone Designations.

Definitions of FEMA Flood Zone Designations	
Zone	**Description**
High Risk Areas	
Zone AE and A1-A30	Zones AE and A1-A30 are the flood insurance rate zones that correspond to the 1-percent annual chance floodplains that are determined in the Flood Insurance Study by detailed methods of analysis. In most instances, Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.
Zone AH	Zone AH is the flood insurance rate zone that corresponds to the areas of 1-percent annual chance shallow flooding with a constant water-surface elevation (usually areas of ponding) where average depths are between 1 and 3 feet. The Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.
Zone AO	Zone AO is the flood insurance rate zone that corresponds to the areas of 1-percent shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average flood depths derived from the detailed hydraulic analyses are shown within this zone. In addition, alluvial fan flood hazards are shown as Zone AO on the Flood Insurance Rate Map. Mandatory flood insurance purchase requirements apply.
Moderate to Low Risk Areas	
Zone X (shaded)	Zone X is an area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. Also used to designate floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile. Flood insurance purchase requirements do not apply.

Table 13: Definitions of FEMA Flood Zone Designations

Residential Structures at Risk in a FEMA Flood Zone

There are a total of ninety nine structures within a FEMA Flood Zone. Of these ninety nine structures, one is an essential facility (high school); forty five properties contain forty seven residential structures. Of these forty five properties forty one are single family residential homes, three are residential duplexes and one is a residential quadplex. Thirty nine structures are commercial buildings, and two are mobile home parks. The mobile home parks contain a single office, single laundry building and multiple homes on the property. Three structures are sheds and seven are water and waste water utilities. There are two main areas within Peoria that have a concentration of structures within a Flood Zone. The first is along Rock Springs and the second is along US 60 between 87th Avenue and 73rd Avenue. The homes and structures along Rock Springs are all within the AE Zone. There was a LOMR completed in 2001 (01-09-1060P) that designated Rock Springs as a Floodplain. Rock Springs is a tributary to New River and this LOMR added approximately three miles of floodplain to the area. The second area around US 60 is all classified as AH and/or AO zones. These are areas where there will be ponding and/or shallow flow during a 100-year event. During an event these areas need to be monitored closely and if

any people are within the floodplain they need to be informed of the possible danger during a flood event. See Table 14 for a list and Figures 16-20 for maps of the structures at-risk within the Peoria FRP.

Residential Structures within the FEMA Flood Zone					
Subdivision	**River/Wash Name**	**FEMA Zone**	**Parcel Number**	**Address**	**Structure**
Pending LOMR	Rock Springs Creek	AE	210-14-371	7908 W Villa Lindo	SFR
Pending LOMR	Rock Springs Creek	AE	201-14-037E	23875 N 79th Ave	SFR
Pending LOMR	Rock Springs Creek	AE	201-14-037B	7816 W Avenida Del Sol	SFR
Pending LOMR	Rock Springs Creek	AE	201-14-037D	23827 N 79th Ave	SFR
Pending LOMR	Rock Springs Creek	AE	201-14-429	7928 W Avenida Del Sol	SFR
Pending LOMR	Rock Springs Creek	AE	201-14-108E	23783 N 79th Ave	SFR
Pending LOMR	Rock Springs Creek	AE	201-14-108F	23775 N 79th Ave	SFR
Pending LOMR	Rock Springs Creek	AE	201-14-107	23676 N 78th Ave	SFR
Pending LOMR	Rock Springs Creek	AE	201-14-104B	7776 W Camino De Oro	SFR
Pending LOMR	Rock Springs Creek	AE	201-14-200	7813 W Camino De Oro	SFR
Pending LOMR	Rock Springs Creek	AE	201-14-019C	7787 W Camino De Oro	SFR
Pending LOMR	Rock Springs Creek	AE	201-14-019D	7733 W Camino De Oro	SFR
Pending LOMR	Rock Springs Creek	AE	201-14-201A	7820 W Pinnacle Peak Rd	SFR
Pending LOMR	Rock Springs Creek	AE	201-14-021B	7786 W Pinnacle Peak Rd	SFR
Pending LOMR	Rock Springs Creek	AE	201-14-021A	7748 W Pinnacle Peak Rd	SFR
Pending LOMR	Rock Springs Creek	AE	201-14-020C	7708 W Pinnacle Peak Rd	SFR
Pending LOMR	Rock Springs Creek	AE	201-14-020B	23456 N 77th Ave	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-011	8342 W Edwards St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-010	8338 W Edwards St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-008	8330 W Edwards St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-007	8326 W Edwards St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-006/ 142-42-005	8322 W Edwards St 8318 W Edwards St	Duplex
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-004	8312 W Edwards St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-003	8310 W Edwards St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-002/ 142-42-001	8302 W Edwards St	Duplex
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-031	8337 W Edwards St	Duplex & SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-030	8333 W Edwards St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-028	8329 W Edwards St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-026	8325 W Edwards St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-024	8321 W Edwards St	Duplex
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-022	8317 W Edwards St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-020	8311 W Edwards St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-014 142-42-015 142-42-018	10930 N 83rd Ave 10920 N 83rd Ave 8309 W Edwards St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-016	10910 N 83rd Ave	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-019	8310 W Stone St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-021	8314 W Stone St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-023	8318 W Stone St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-025	8322 W Stone St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-027	8326 W Stone St	SFR
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-029B	8334 W Stone St	SFR
Sunset View	BNSF Railroad Impoundment	AO	142-12-516	7877 W Cinnabar Ave	SFR
Park View West	BNSF Railroad Impoundment	AH	143-10-006	9202 N 74th Dr	SFR
Mount Acres	BNSF Railroad Impoundment	AH	142-19-002	9250 N 75th Ave	Mobile Home Park
Mount Acres	BNSF Railroad Impoundment	AH	142-19-003	9250 N 75th Ave	Mobile Home Park
Edward's Add.	BNSF Railroad Impoundment	AH	142-42-017	10900 N 83rd Ave	SFR

Table 14 : Residential Structures within the FEMA Flood Zone

Other Structures at Risk in a FEMA Flood Zone

In addition to the residential structures listed above, there are also commercial structures and sheds that are within the FEMA Flood Zones. The zones range from A, AE, AH, and AO. These areas will have ponding and/or shallow flow during a 100-year event. During an event these areas need to be monitored closely and if any people are within the floodplain they need to be informed of the possible danger during a flood event. See Table 15 for a list and Figures 16-20 for maps of the structures at-risk within the Peoria FRP.

Other Structures at Risk				
Subdivision/Location/ River/Wash Name	**FEMA Zone**	**Parcel Number**	**Address**	**Structure**
Peoria High School	AH	142-44-001	11200 N 83rd Ave	Essential Facility
Unnamed Wash No.1	A	201-18-001	10402 W Carefree Hwy	Commercial & Sheds
Caterpillar Tank Wash	AE	503-88-007G	N/A	Shed
Agua Fria River	AE	201-17-084	24968 N 107th Ave	Utilities - Sanitary Lift
Agua Fria River	AE	201-17-083	24847 N 107th Ave	Utilities - Booster Station
Agua Fria River	AE	142-74-006A	N/A	Commercial
BNSF Railroad Impoundment	AH	142-42-039	8325 W Stone St	Utilities - Water Reservoir
BNSF Railroad Impoundment	AH	142-42-038	8325 W Stone St	Utilities - Water Well
Marinette Heading Canal	A	200-09-210A	9963 W Lake Pleasant Pkwy	Utilities - Water Well
BNSF Railroad Impoundment	AE	142-14-007A, 142-14-008A, 142-14-009A, 142-15-010A	8181 W Peoria Ave	Commercial
BNSF Railroad Impoundment	AE	142-14-016C	N/A	Commercial
BNSF Railroad Impoundment	AO	142-13-001A	8010 W Market St	Commercial
BNSF Railroad Impoundment	AO	142-13-008E	7962 W Gold Dust Ave	Commercial
BNSF Railroad Impoundment	AO	142-13-008F	7852 W Gold Dust Ave	Commercial
BNSF Railroad Impoundment	AO	142-13-008G	7942 W Gold Dust Ave	Commercial
BNSF Railroad Impoundment	AO	142-13-008P	7961 W Gold Dust Ave	Commercial
BNSF Railroad Impoundment	AO	142-13-008N	N/A	Commercial
BNSF Railroad Impoundment	AO	142-13-008Q	N/A	Commercial
BNSF Railroad Impoundment	AO	142-13-007B	7910 W Market St	Commercial
BNSF Railroad Impoundment	AH	142-18-007	N/A	Commercial
BNSF Railroad Impoundment	AH	142-18-008	N/A	Commercial
BNSF Railroad Impoundment	AH	142-18-032	7642 W Vogel Ave	Commercial
BNSF Railroad Impoundment	AH	142-18-031	7642 W Vogel Ave	Commercial
BNSF Railroad Impoundment	AH	142-18-030	7642 W Vogel Ave	Commercial
BNSF Railroad Impoundment	AH	142-18-027	7612 W Vogel Ave	Commercial
BNSF Railroad Impoundment	AH	142-18-028	7612 W Vogel Ave	Commercial
BNSF Railroad Impoundment	AH	142-18-029	7612 W Vogel Ave	Commercial
BNSF Railroad Impoundment	AH	142-18-012	7574 W Vogel Ave	Commercial
BNSF Railroad Impoundment	AH	142-19-004D	N/A	Utilities - Water Well
BNSF Railroad Impoundment	AH	142-18-016	7634 W Carol Ave	Commercial
BNSF Railroad Impoundment	AH	142-18-017B	7575 W Carol Ave	Commercial
BNSF Railroad Impoundment	AH	142-18-017A	7563 W Vogel Ave	Commercial
BNSF Railroad Impoundment	AH	142-18-019	9510 N 75th Ave	Commercial
BNSF Railroad Impoundment	AH	142-18-024A	7605 W Carol Ave	Commercial
BNSF Railroad Impoundment	AH	142-18-023	7595 W Carol Ave	Commercial
BNSF Railroad Impoundment	AH	142-18-022	7533 W Carol Ave	Commercial
BNSF Railroad Impoundment	AH	142-18-020	9440 N 75th Ave	Commercial
BNSF Railroad Impoundment	AH	142-18-021	9440 N 75th Ave	Commercial
BNSF Railroad Impoundment	AH	142-18-026D	7659 W Hatcher Rd	Commercial
BNSF Railroad Impoundment	AH	142-18-026C	7649 W Hatcher Rd	Commercial

Other Structures at Risk				
Subdivision/Location/ River/Wash Name	**FEMA Zone**	**Parcel Number**	**Address**	**Structure**
BNSF Railroad Impoundment	AH	142-18-026A	7609 W Hatcher Rd	Commercial
BNSF Railroad Impoundment	AH	143-10-005G	7410 W Olive Ave	Commercial
BNSF Railroad Impoundment	AH	143-10-005H	7400 W Olive Ave	Commercial
BNSF Railroad Impoundment	AH	143-10-005C	7380 W Olive Ave	Commercial
Rock Springs Wash	A	200-07-001E	N/A	Utilities - Water Well
Rock Springs Wash	AE	201-14-105	7850 W Camino De Oro	Shed
Rock Springs Wash	AH	201-14-380	7910 W Briden Ln	Shed

Table 15: Other Structures at Risk

Structures Removed from FEMA Flood Zone by LOMR-F

In addition to the ninety nine structures listed above, there are an additional twenty six structures that have been removed from the FEMA Flood Zone. Eleven are removed by a Letter of Map Revisions Based on Fill (LOMR-F) document approved by FEMA and one was removed by a LOMR-FW. A LOMR-F is submitted for properties on which fill has been placed to raise a structure or lot to or above the Base Flood Elevation (BFE). National Flood Insurance Program (NFIP) regulations require that the lowest adjacent grade of the structure be at or above the BFE for a LOMR-F to be issued to remove the structure from the SFHA. The participating community must also determine that the land and any existing or proposed structures to be removed from the SFHA are "reasonably safe from flooding." To remove an entire lot and structure, both the lowest point on the lot and the lowest adjacent grade of the structure must be at or above the BFE (FEMA). The other fourteen parcels have approved elevation certificates that show the building is not at risk of the 100-year base flood elevation.

The Fletcher Heights (Phase 2B-3) subdivision is located north of Deer Valley Road and just west of 75th Ave/New River. This community has fifteen single family residential homes that were located within the FEMA FW Zone. One of these structures has been removed by approved LOMR-FW 09-09-0096A. All fifteen of these lots have elevation certificates that show the BFE (Base Flood Elevation) is lower than the lowest adjacent (finished) grade next to the building. Copper Creek Estates subdivision is located north of Pinnacle Peak Road, west of 73rd Avenue and east of New River. There is one single family residential home that was located within the FEMA Zone AE Zone. This structure has been removed by an approved LOMR-F 05-09-0596A. The WestWing Mountain subdivision is located just north of Jomax Road and east of Westwing Parkway/83rd Avenue. This community has a total of six single family residential homes that were within the FEMA Zone AE Floodplain. These structures have been removed by an approved LOMR-F 12-09-1984A.

The Replat of Terramar Parcel 9B subdivision is located just north of Happy Valley Road and east of New River. This community has a total of four single family residential lots, with eventual structures, that were within the FEMA Zone AE Floodplain. These structures have been removed by an approved LOMR-F 13-09-2227A.

A complete list of all the structures that have an approved LOMR-F with Case Numbers are listed below in Table 16. Copies of these documents and the elevation certificates are available in Appendix D.

Structures Removed from FEMA Flood Zone by LOMR-F						
Subdivision	**River/Wash Name**	**Parcel Number**	**Old FEMA Zone**	**New FEMA Zone**	**LOMR-F and LOMR- FW Case No.'s**	**Elevation Certificate**
Fletcher Heights	New River	200-07-683	FW	X (shaded)	09-09-0096A	Yes
Fletcher Heights	New River	200-07-684	FW	X (shaded)	N/A	Yes
Fletcher Heights	New River	200-07-685	FW	X (shaded)	N/A	Yes
Fletcher Heights	New River	200-07-686	FW	X (shaded)	N/A	Yes
Fletcher Heights	New River	200-07-687	FW	X (shaded)	N/A	Yes
Fletcher Heights	New River	200-07-688	FW	X (shaded)	N/A	Yes
Fletcher Heights	New River	200-07-689	FW	X (shaded)	N/A	Yes
Fletcher Heights	New River	200-07-690	FW	X (shaded)	N/A	Yes
Fletcher Heights	New River	200-07-691	FW	X (shaded)	N/A	Yes
Fletcher Heights	New River	200-07-692	FW	X (shaded)	N/A	Yes
Fletcher Heights	New River	200-07-693	FW	X (shaded)	N/A	Yes
Fletcher Heights	New River	200-07-694	FW	X (shaded)	N/A	Yes
Fletcher Heights	New River	200-07-695	FW	X (shaded)	N/A	Yes
Fletcher Heights	New River	200-07-696	FW	X (shaded)	N/A	Yes
Fletcher Heights	New River	200-07-697	FW	X (shaded)	N/A	Yes
Copper Creek Estates	New River	201-13-215	AE	X (shaded)	05-09-0596A	N/A
West Wing Mountain	Rock Springs Creek	201-06-535	AE	X (shaded)	12-09-1984A	N/A
West Wing Mountain	Rock Springs Creek	201-06-536	AE	X (shaded)	12-09-1984A	N/A
West Wing Mountain	Rock Springs Creek	201-06-537	AE	X (shaded)	12-09-1984A	N/A
West Wing Mountain	Rock Springs Creek	201-06-538	AE	X (shaded)	12-09-1984A	N/A
West Wing Mountain	Rock Springs Creek	201-06-539	AE	X (shaded)	12-09-1984A	N/A
West Wing Mountain	Rock Springs Creek	201-06-540	AE	X (shaded)	12-09-1984A	N/A
Replat of Terramar Parcel 9b	New River	201-30-191	AE	X (shaded)	13-09-2227A	N/A
Replat of Terramar Parcel 9b	New River	201-30-192	AE	X (shaded)	13-09-2227A	N/A
Replat of Terramar Parcel 9b	New River	201-30-193	AE	X (shaded)	13-09-2227A	N/A
Replat of Terramar Parcel 9b	New River	201-30-194	AE	X (shaded)	13-09-2227A	N/A

Table 16: Structures Removed from FEMA Flood Zone by LOMR-F

Structures within the Flood Control District Easement

WestWing Mountain subdivision has six parcels and five single family residential homes that are located within a Flood Control District of Maricopa County Easement. This easement is for the New River Dam Spillway. These structures were constructed around 2003 without the District's knowledge. This land is the District's property, where we reserve the right to flood the properties if necessary. The easement states "Provided that no structures for human habitation shall be constructed or maintained on the land". If New River Dam reaches a level where spillway discharge is anticipated or expected please refer to the flow charts in the Emergency Action Section of this FRP. The notifications and evacuations will be handled by Peoria. For a map of the easement boundary, refer to Figure 15 below. This easement stops at Jomax Road and will be an~~d~~ ongoing issue for the area because new homes are going to be built south of Jomax Road. The recorded easement can be found by searching recording number 1984063659 at http://recorder.maricopa.gov/recdocdata/. A copy of the easement is in Appendix E.

Structures within the FCD Easement		
Subdivision	**River/Wash Name**	**APN #**
West Wing Mountain	Rock Springs Creek	201-06-411
West Wing Mountain	Rock Springs Creek	201-06-412
West Wing Mountain	Rock Springs Creek	201-16-413
West Wing Mountain	Rock Springs Creek	201-16-414
West Wing Mountain	Rock Springs Creek	201-06-540

Table 17: Structures within the FCD Easement

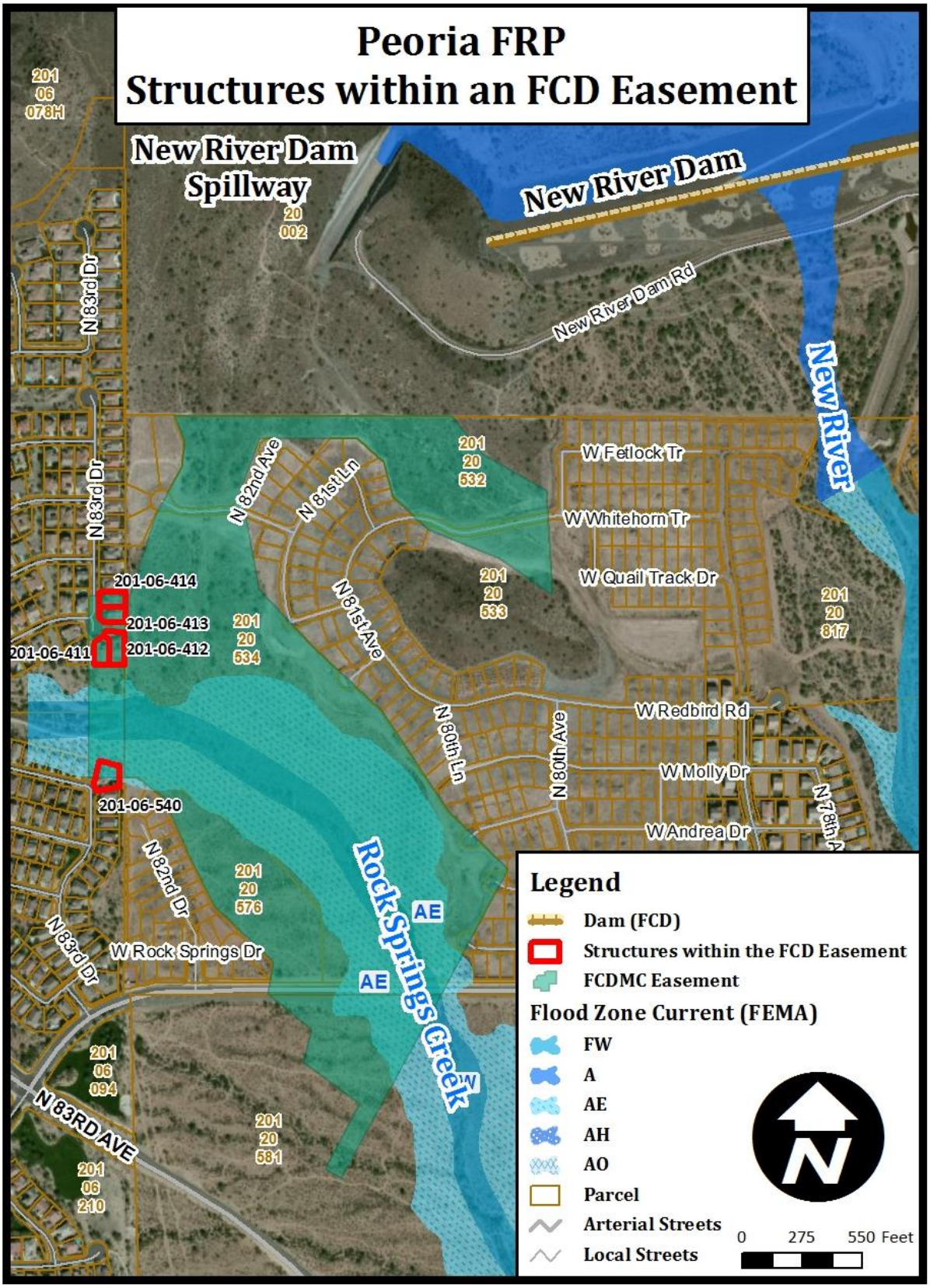


Figure 15: Structures within the FCD Easement

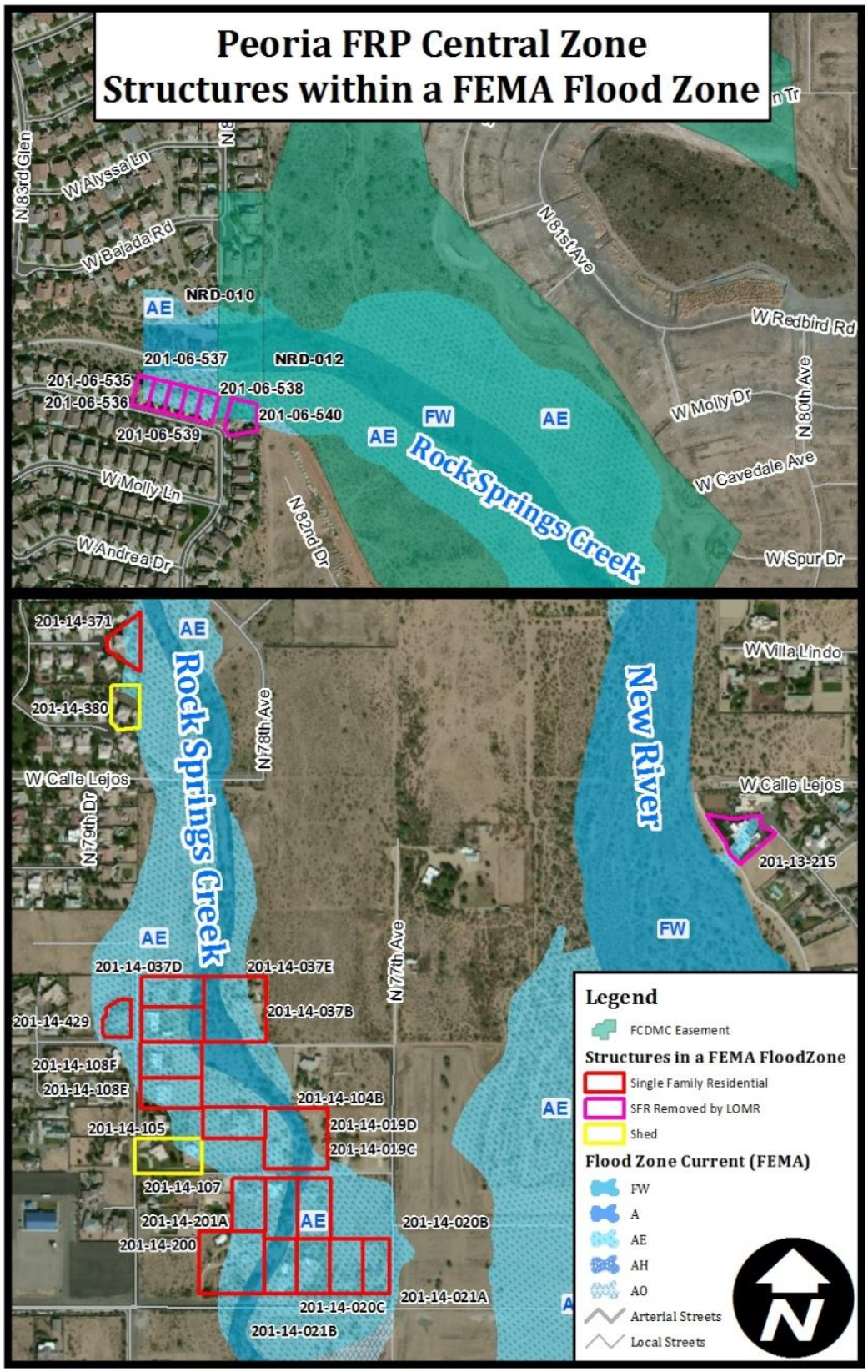


Figure 16: Structures in Central Peoria FRP Zone (1)

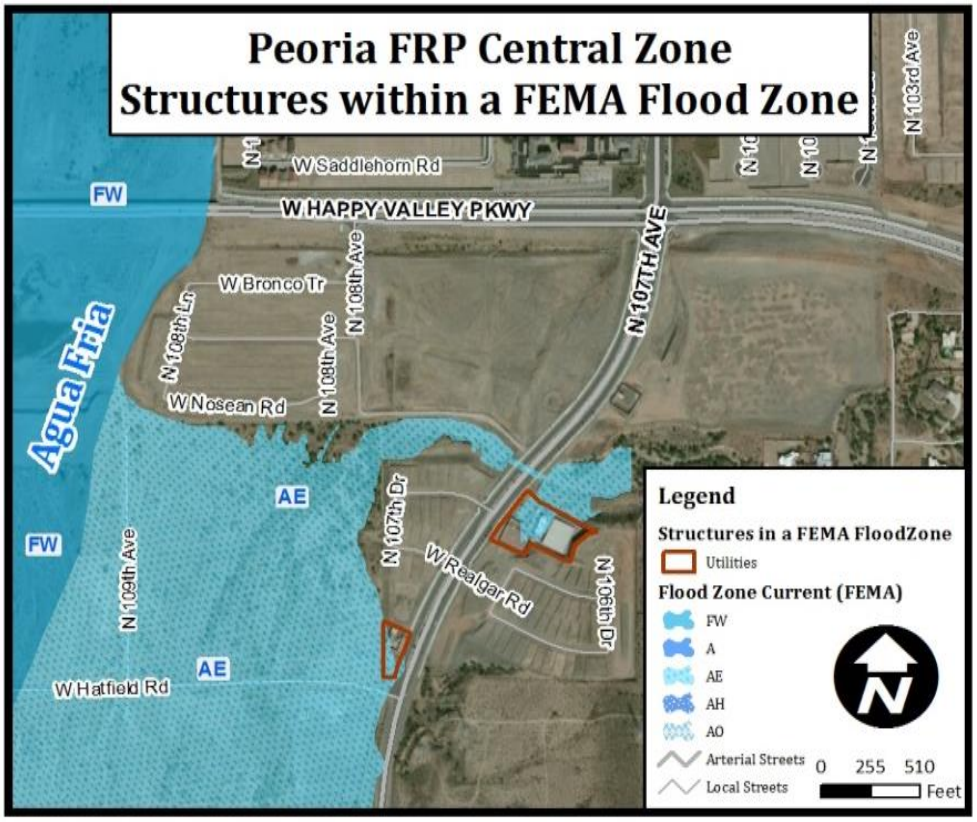


Figure 17: Structures in Central Peoria FRP Zone (2)

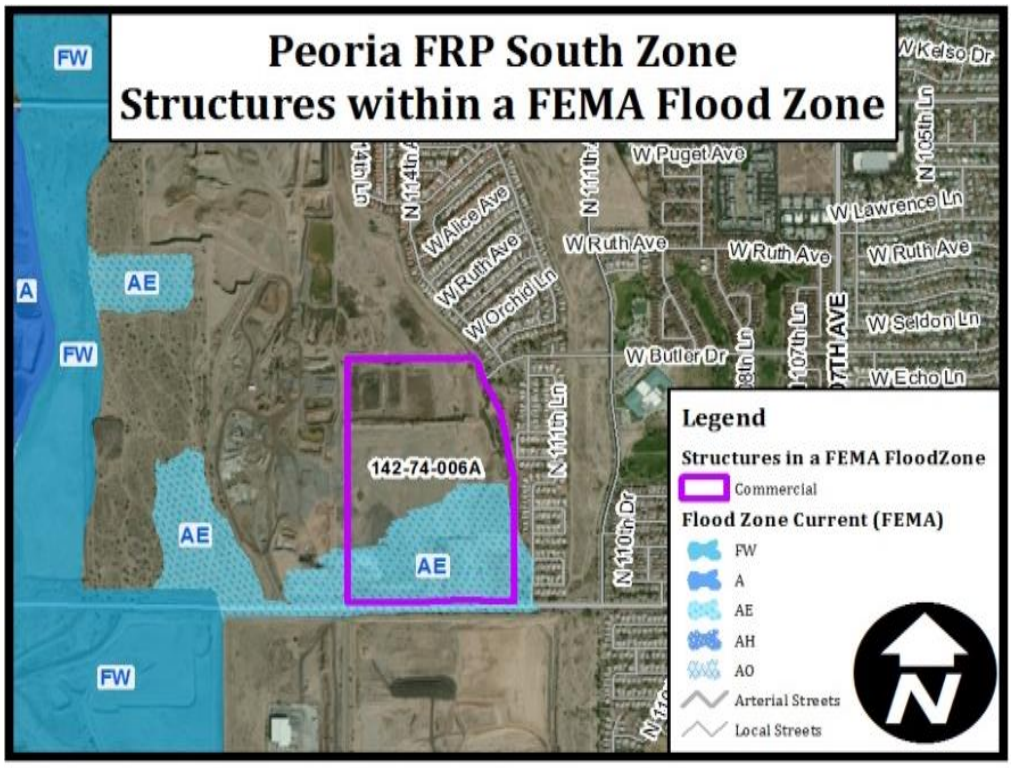


Figure 18: Structures in South Peoria FRP Zone (2)

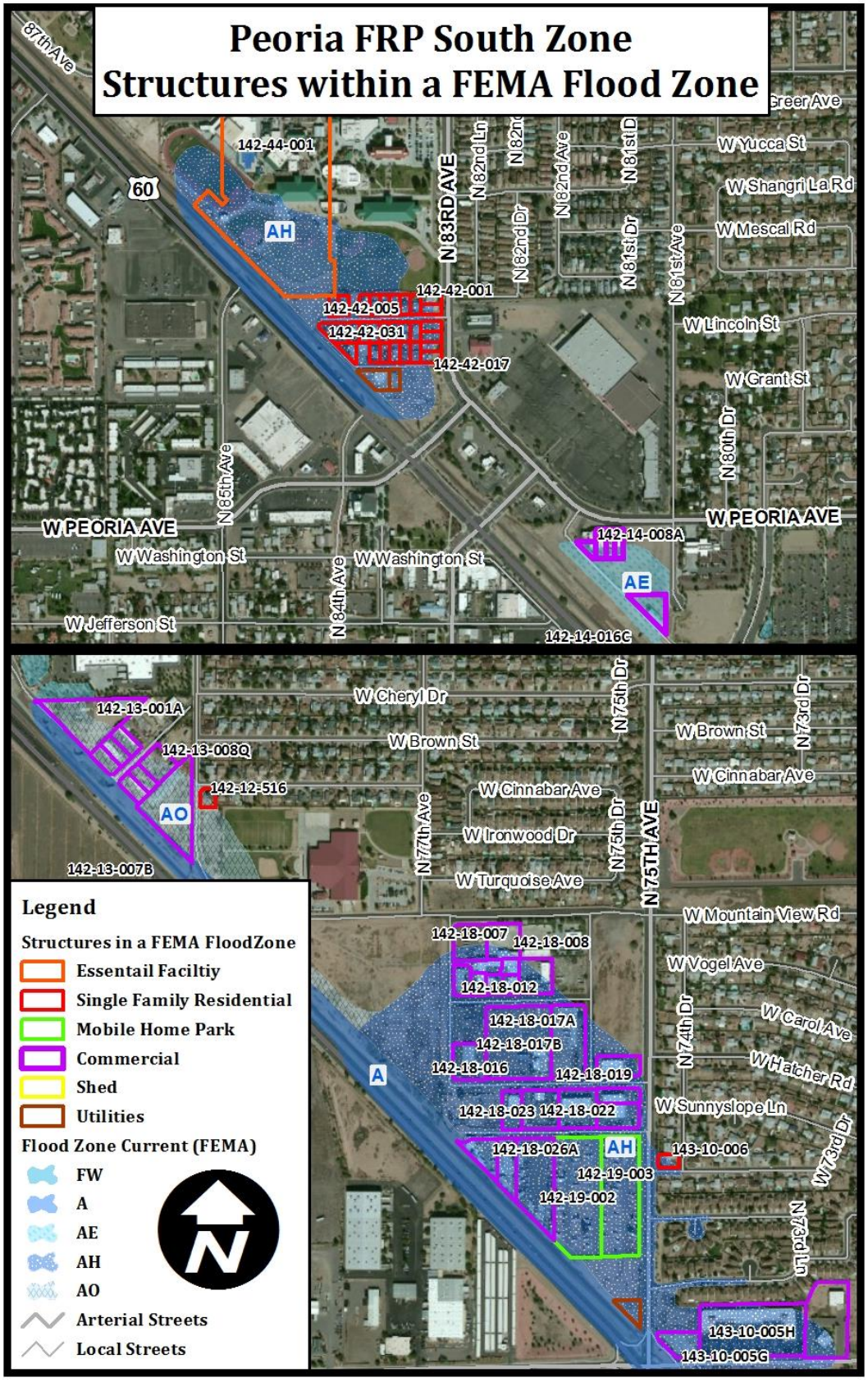


Figure 19: Structures in South Peoria FRP Zone (1)

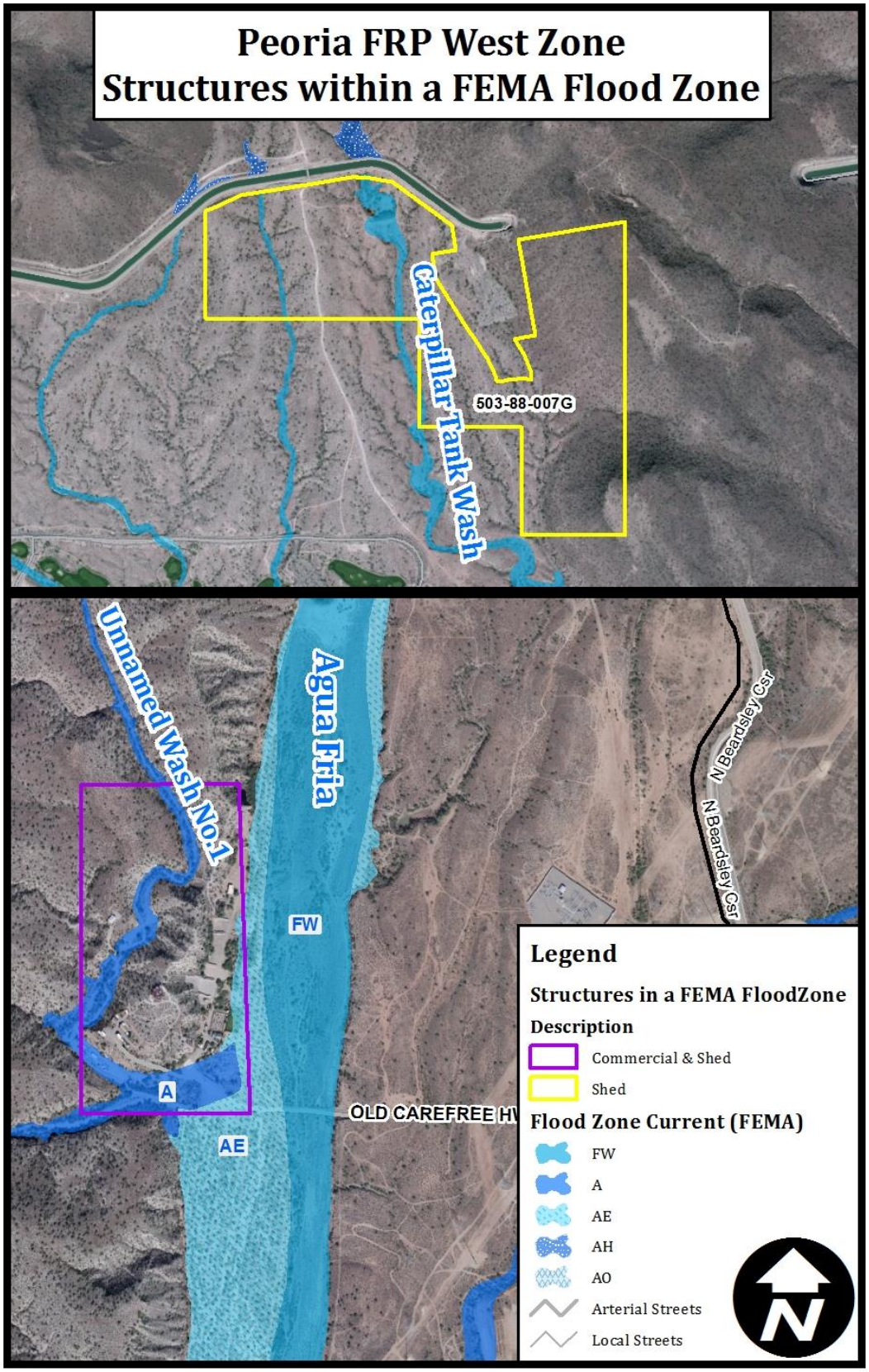


Figure 20: Structures in West Peoria FRP Zone

DISSEMINATION OF INFORMATION

Good communication among the participating agencies is critical to the success of the Peoria FRP. The responsibilities of the entities involved are identified below.

District Responsibilities

An important function of the District is to monitor rainfall and runoff conditions through its county-wide real-time flood detection and data collection network to support its flood control facilities and local jurisdictions within the County. The District is responsible for notifying the City of Peoria of potential or occurring flooding within Peoria. The District provides available weather and flooding information to the City and may offer opinions of flood threat based on the information it collects. Notification responsibilities include products prepared by its in-house MSP describing anticipated heavy storms that are likely to fill washes and temporally restrict passage, as well as more specific data from area precipitation and stage gauges.

City of Peoria Police

Peoria Police are tasked with monitoring flood emergency situations within the City of Peoria and coordinating support, if needed, with the Maricopa County Sheriff's Office (MCSO) and/or Yavapai County Sherriff's Office (YCSO). The Police are also responsible for notifying Peoria residents who are potentially in harm's way. Park Rangers who work for the Police Department are responsible for monitoring parks and closing particular parks and trail entrances/exits.

City of Peoria Fire Department

The Fire Department protects and preserves life and property from the impact of fire, disaster, injury and illness by providing fire suppression, fire prevention, and emergency medical services to the citizenry within the community. The City of Peoria Police Department will work closely with the Fire Department to monitor road crossings and structures in the event of a flood.

City of Peoria Engineering Department

Peoria Engineering is tasked with reviewing information from Police Department/Emergency Manager and assisting the Police Department through a flood event. Engineering will offer engineering expertise to other departments as necessary.

City of Peoria Public Works Department

Public Works will provide road information, barricades, lights, assistance to police and oversee barricade and debris removal when roads are reopened.

City of Peoria Community Services Department

Peoria Community Services is tasked with reviewing information from Police Department/Emergency Manager and with monitoring and maintaining all city parks within the PFRP. They will provide assistance to Public Works and Engineering as necessary.

Maricopa County Department of Emergency Management

Maricopa County Department of Emergency Management is tasked with monitoring information given them from the Flood Control District and the City of Peoria EOC Chief/City Manager/Emergency Manager. They will activate the county Emergency Operations Center if needed.

Maricopa County Parks and Recreation

Maricopa County Parks and Recreation is tasked with monitoring Lake Pleasant Recreation and the Maricopa County Trail System. Closures of these areas would be conducted by Maricopa County Sheriff's Office (MCSO).

Maricopa County Department of Transportation

Maricopa County Department of Transportation will perform any road closures necessary within the Maricopa County Lake Pleasant Regional Park.

Arizona Department of Transportation

Arizona Department of Transportation will monitor and barricade any state roads if necessary.

EMERGENCY RESPONSE ACTIONS

Declaration of Flood Conditions

The City has developed the Emergency Support Function (ESF) Structure as part of its Emergency Operations Plan. Similarly, FLOOD CONDITIONS are adapted herein as they apply to flooding in Peoria.

FLOOD CONDITION 1

The term "**FLOOD CONDITION 1**" will be used to denote a situation that causes a higher degree of readiness than is normally present. "**FLOOD CONDITION 1**" actions could be generated by:

i. An issuance by the National Weather Service of a severe weather watch or flash flood watch or urban/stream flood advisory; and/or
ii. Notification by the Flood Control District of Maricopa that weather conditions may develop into a flood situation for Peoria and/or a **Message 1**.

FLOOD CONDITION 2

The term "**FLOOD CONDITION 2**" will be used by the City to refer to a situation that presents a greater potential threat than "**FLOOD CONDITION 1**", but poses no immediate threat to life and/or property. This situation includes potential threats that could develop into a hazardous condition. "**FLOOD CONDITION 2**" actions could be generated by:

i. An issuance by the National Weather Service of a severe weather warning or a flash flood warning and/or;
ii. Notification by the Flood Control District of Maricopa County that rainfall has been detected upstream of or within Peoria and conditions may develop into a flood situation and/or a **Message 2**.
iii. Observed floodwaters in Peoria.

FLOOD CONDITION 3

The term "**FLOOD CONDITION 3**" will be used by the City to signify that hazardous conditions are imminent or occurring. "**FLOOD CONDITION 3**" denotes a greater sense of danger and urgency and could be generated by:

i. An issuance by the National Weather Service of a severe weather or flash flood warning by the National Weather Service combined with factors making the effect more imminent such as a severe storm sighting near or moving toward Peoria or its contributing watersheds.
ii. Notification by the Flood Control District of Maricopa County of observed flood conditions in and/or upstream of Peoria and/or a **Message 3.**
iii. Observed floodwaters in Peoria.

Note that the flood condition criteria are guidelines only and cannot cover all scenarios of flood emergencies. The Mayor or City Manager or their designee also has the authority to declare a state of increased readiness at any time based on available information and impending conditions.

Routine Operational Procedures

Flooding in Peoria is infrequent and unpredictable. Therefore, it is important to perform daily monitoring procedures so that the staff is familiar with the procedures when a flood occurs. During normal (non-flood) conditions, these actions are recommended (Figure 21):

Police Dispatch

Police Dispatch and/or the Fire Department Alarm Room is responsible for notifying the City of FLOOD CONDITIONS to signify an increase of flood threat to Peoria (Refer to page 17 of the Peoria EOP). In addition, Police Dispatch should monitor weather data daily during fair weather. Daily monitoring during fair weather consists of the following tasks:

i. Review weather outlooks from the Flood Control District of Maricopa County, National Weather Service daily forecasts and Central Arizona Project.
    a. FCDMC Weather Outlooks, Messages and Lake Alerts are sent via email to addresses provided to FCDMC. Weather Outlooks are available online at http://www.fcd.maricopa.gov/Rainfall/Weather/outlook.aspx.
    b. NWS Quick Forecast is available at http://forecast.weather.gov/afm/PointClick.php?lat=33.5825&lon=-112.238611.
    c. Central Arizona Project
ii. Distribute FCDMC, NWS and CAP forecasts to Police, Fire, Public Works and the Community Services Department.
iii. Monitor daily weather information.

Public Works Department

i. Review weather information provided by Police Dispatch and/or Fire Department Alarm Room.

Community Services Department

i. Review weather information provided by Police Dispatch and/or Fire Department Alarm Room.

Fire Department

i. Review weather information provided by Police Dispatch and/or Fire Department Alarm Room.

Peoria Flood Response Plan

Routine Operational Procedures Flowchart

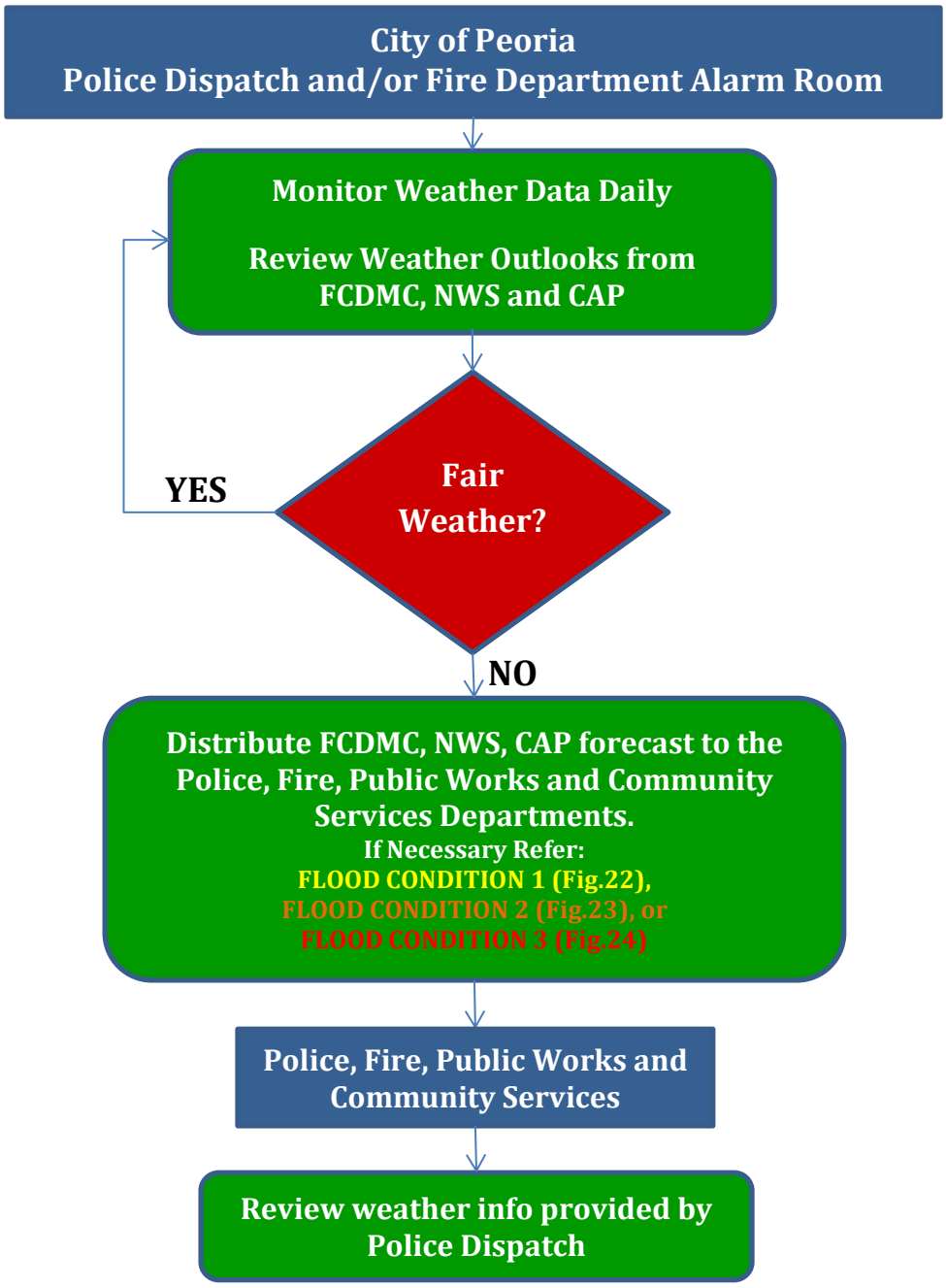


Figure 21 : Routine Operation Procedure Flowchart

FLOOD CONDITION 1 Procedures

Upon declaration of **FLOOD CONDITION 1**, all departments shall maintain an increased state of readiness. If **FLOOD CONDITION 1** is declared for Peoria, the following additional tasks will be performed (Figure 22):

Police Dispatch

i. Notify Police Patrol Units, Community Services, Public Works and Fire of elevated **FLOOD CONDITION 1** status.
ii. Monitor incoming weather information from FCDMC, NWS and others.

Police Department

i. Monitor all areas within the **FLOOD CONDITION 1** Boxes on the FRP Maps located in Appendix A.
ii. Review weather information provided by Police Dispatch and/or Fire Department Alarm Room.

Public Works Department

i. Monitor and provide barricades if necessary to all areas within the **FLOOD CONDITION 1** Boxes on the FRP Maps.
ii. Review weather information provided by Police Dispatch and/or Fire Department Alarm Room.

Community Services Department

i. Monitor all areas within the **FLOOD CONDITION 1** Boxes on the FRP Maps located in Appendix A.
ii. Provide Public Works with park information which can include but is not limited to observations, pictures, and assistance.
iii. Review weather information provided by Police Dispatch and/or Fire Department Alarm Room.

Fire Department

i. Review weather information provided by Police Dispatch and/or Fire Department Alarm Room.

NOTE: MCP&R and MCSO are not notified by City of Peoria Police Dispatch. They are contacted directly from FCDMC. They are included in these procedures because they have responsibilities within Lake Pleasant Regional Park. These responsibilities are included in the Flood Condition Boxes on the FRP Maps located in Appendix A.

Maricopa County Parks and Recreation Department

i. Monitor all areas within the North Zone **FLOOD CONDITION 1** Boxes on the FRP Maps located in Appendix A.
ii. Review weather information and lake alerts provided from FCDMC.

Maricopa County Sherriff's Office

i. Monitor all areas within the North Zone **FLOOD CONDITION 1** Boxes on the FRP Maps located in Appendix A.
ii. Review weather information and lake alerts provided from FCDMC.

FLOOD CONDITION 1 Operational Procedures Flowchart

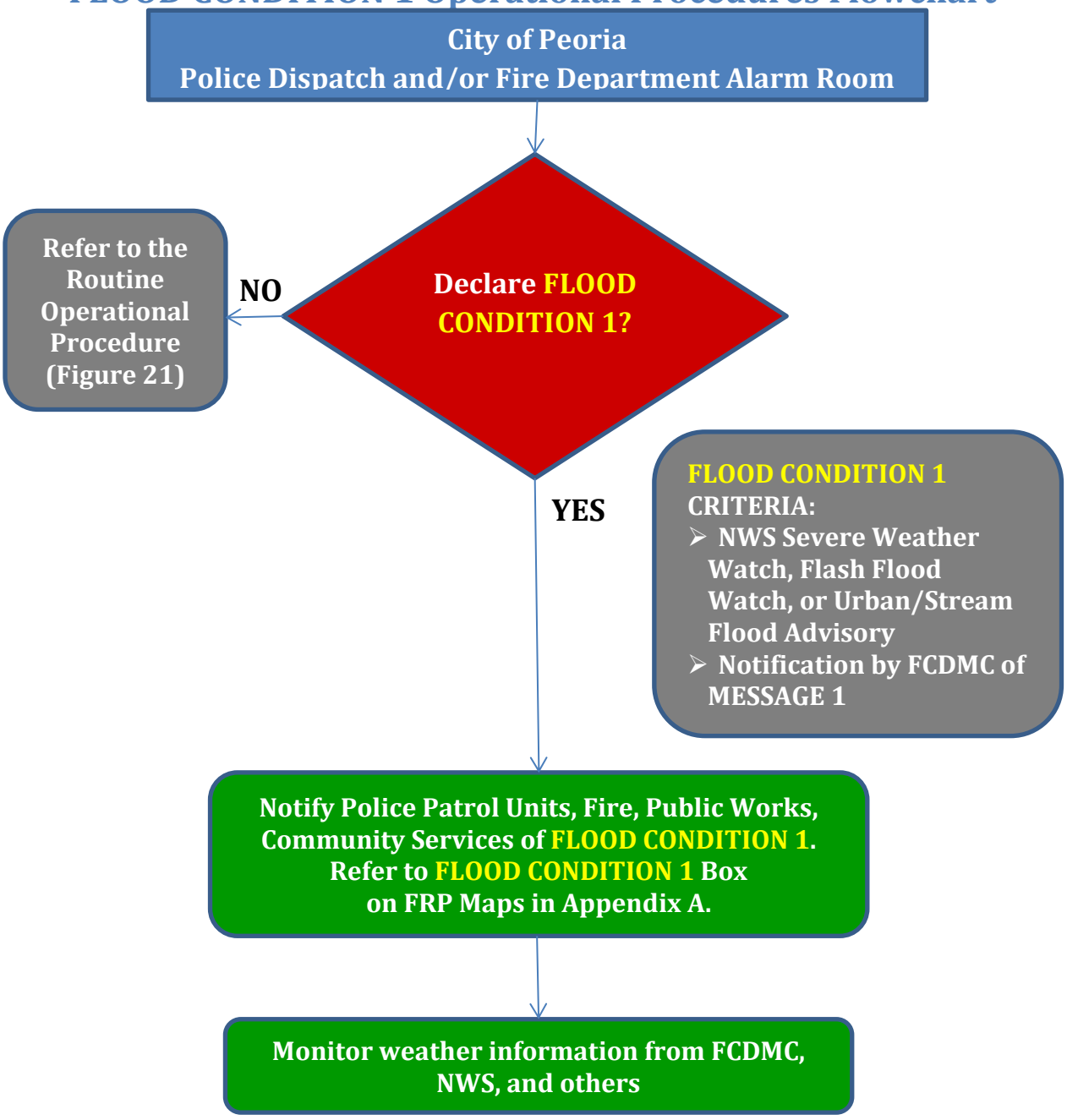


Figure 22 : FLOOD CONDITION 1 Flowchart

FLOOD CONDITION 2 Procedures

If **FLOOD CONDITION 2** is declared for Peoria, the following tasks will be performed (Figure 23):

Police Dispatch

i. Notify Police Patrol Units, Fire, Public Works and Community Services of elevated **FLOOD CONDITION 2** status.
ii. Update Peoria City Manager and/or Emergency Manager as needed on the developing flood threat. Relay message if ESF5 status activated.
iii. Dispatch police units.
iv. If emergency spillway discharge or potential dam failure is imminent or occurring
    a. Notify City Manager and/or Emergency Manager, FCDMC and MCDEM.
    b. Assign EOC Chief
    c. Evacuate 5 homes located in Rock Springs Subdivision.
    d. Monitor and evacuate homes in West Wing Subdivision that is located in the FCDMC Easement if needed.
    e. Once homes are evacuated Whitehorn Trail needs to be closed.
    f. All departments follow procedures in the New Waddell EAP, New River EAP, Adobe Dam EAP and/or the Cave Buttes EAP.
v. Monitor incoming weather information from FCDMC, NWS and others.

Police Department

i. When directed by Police Dispatch, dispatch patrol units.
ii. Monitor all areas within the **FLOOD CONDITION 2** Boxes on the FRP Maps and report any flood concerns to Police Dispatch.
    a. Identify the locations and number of people within flood prone areas.
    b. Notify people within recreational areas of impending flood threat.
iii. Assist with road closures if requested.
iv. Report to Police Dispatch any floodwaters observed.
v. Initiate a Reverse 911 if needed.
vi. Review weather information provided by Police Dispatch and/or Fire Department Alarm Room.

Public Works Department

i. Monitor and provide barricades if necessary to all areas within the **FLOOD CONDITION 2** Boxes on the FRP Maps located in Appendix A.
ii. Furnish and place barricade on roadways and trails as needed.

iii. Provide Police Dispatch with current road information for roads in Peoria.
iv. Review weather information provided by Police Dispatch and/or Fire Department Alarm Room.

Community Services Department

i. Monitor and provide barricades if necessary to all areas within the **FLOOD CONDITION 2** Boxes on the FRP Maps located in Appendix A.
ii. Provide Public Works with park information which can include but is not limited to observations, pictures, and assistance.
iii. Review weather information provided by Police Dispatch and/or Fire Department Alarm Room.

Fire Department

i. Provide assistance to Police and Public Works as needed.
ii. Review weather information provided by Police Dispatch and/or Fire Department Alarm Room.

NOTE: MCP&R and MCSO are not notified by City of Peoria Police Dispatch. They are contacted directly from FCDMC. They are included in these procedures because they have responsibilities within Lake Pleasant Regional Park. These responsibilities are included in the Flood Condition Boxes on the FRP Maps located in Appendix A.

Maricopa County Parks and Recreation Department

i. Monitor all areas within the North Zone **FLOOD CONDITION 2** Boxes on the FRP Maps located in Appendix A.
ii. Review weather information and lake alerts provided from FCDMC.

Maricopa County Sherriff's Office

i. Monitor and barricade any roadways, trails and or recreational areas as needed.
ii. Review weather information and lake alerts provided from FCDMC.

Peoria Flood Response Plan

FLOOD CONDITION 2 Operational Procedures Flowchart

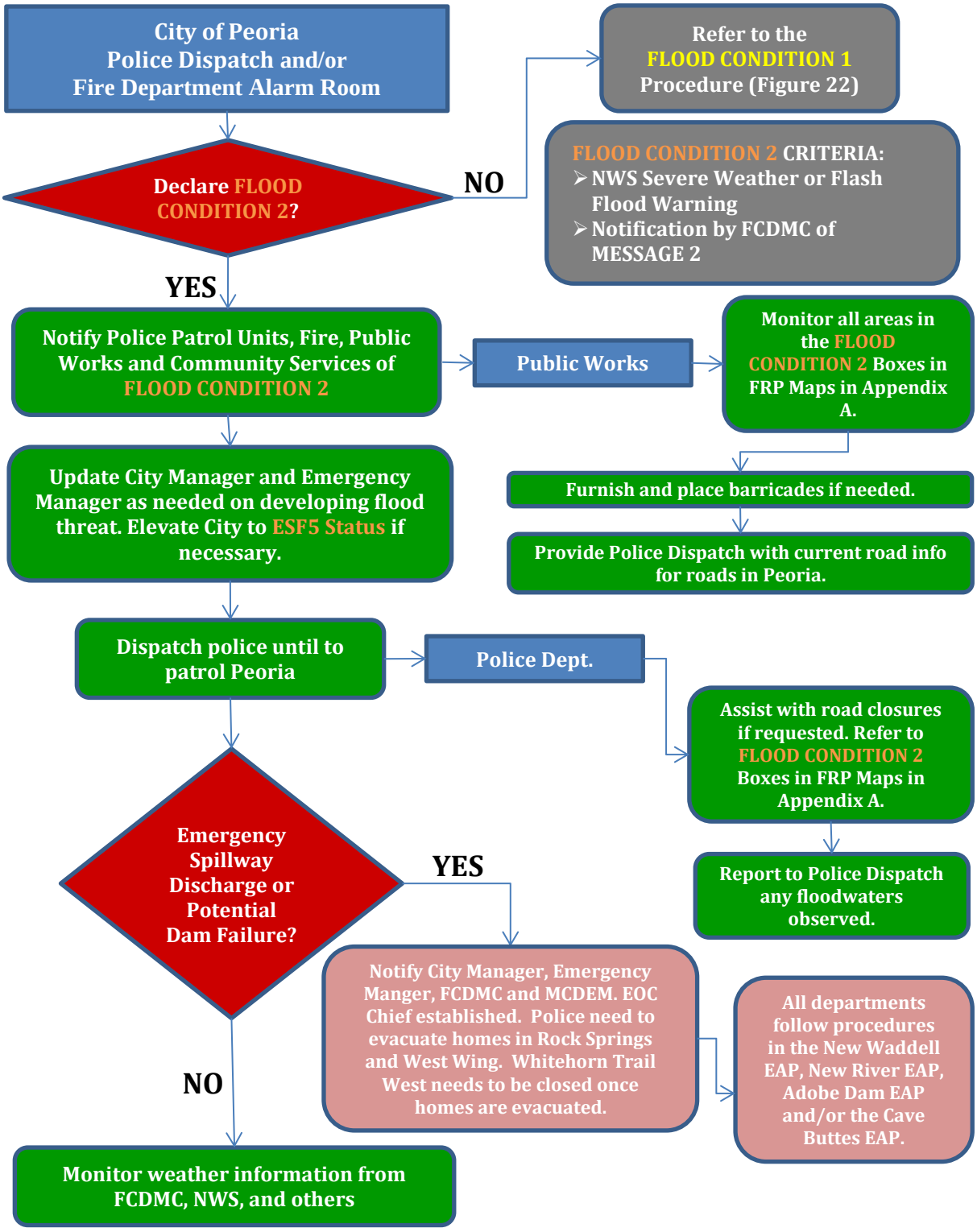


Figure 23 : FLOOD CONDITION 2 Flowchart

FLOOD CONDITION 3 Procedures

Upon declaration of **FLOOD CONDITION 3**, all departments shall maintain an increased state of readiness. If **FLOOD CONDITION 3** is declared for Peoria, the following tasks will be performed (Figure 24):

Police Dispatch

i. Notify Police Patrol Units, Fire, Public Works and Community Services of elevated **FLOOD CONDITION 3** status.
ii. Coordinate with City Manager and/or Emergency Manager as needed to activate the EOC or provide emergency response. Establish an EOC Chief and either continue or upgrade the City's ESF 5 status if necessary.
iii. Dispatch police units.
iv. If emergency spillway discharge or potential dam failure is imminent or occurring:
    a. Notify City Manager and/or City Emergency Manager, FCDMC and MCDEM.
    b. Assign EOC Chief
    c. Evacuate 5 homes located in Rock Springs Subdivision.
    d. Monitor and evacuate homes in West Wing Subdivision that is located in the FCDMC Easement if needed.
    e. Once homes are evacuated Whitehorn Trail need to be closed.
    f. All departments follow procedures in the New Waddell EAP, New River EAP, Adobe Dam EAP and/or the Cave Buttes EAP.
v. Monitor incoming weather information from FCDMC, NWS and others.

Police Department

i. When directed by Police Dispatch, dispatch patrol units.
ii. Monitor all areas within the **FLOOD CONDITION 3** Boxes on the FRP Maps and report any flood concerns to Police Dispatch.
    a. Identify the locations and number of people within flood prone areas.
    b. Notify people within recreational areas of impending flood threat.
iii. Assist with road closures if requested.
iv. Report to Police Dispatch any floodwaters observed.
v. Initiate a Reverse 911 if needed.
vi. Review weather information provided by Police Dispatch and/or Fire Department Alarm Room.

Public Works Department

i. Monitor and provide barricades if necessary to all areas within the **FLOOD CONDITION 3** Boxes on the FRP Maps located in Appendix A.
ii. Furnish and place barricade on roadways and trails as needed.
iii. Provide Police Dispatch with current road information for roads in Peoria.
iv. Review weather information provided by Police Dispatch and/or Fire Department Alarm Room.

Community Services Department

i. Monitor and provide barricades if necessary to all areas within the **FLOOD CONDITION 3** Boxes on the FRP Maps located in Appendix A.
ii. Provide Public Works with park information which can include but is not limited to observations, pictures, and assistance.
iii. Review weather information provided by Police Dispatch and/or Fire Department Alarm Room.

Fire Department

i. Provide assistance to Police and Public Works as needed.
ii. Review weather information provided by Police Dispatch and/or Fire Department Alarm Room.

NOTE: MCP&R and MCSO are not notified by City of Peoria Police Dispatch. They are contacted directly from FCDMC. They are included in these procedures because they have responsibilities within Lake Pleasant Regional Park. These responsibilities are included in the Flood Condition Boxes on the FRP Maps located in Appendix A.

Maricopa County Parks and Recreation Department

i. Monitor all areas within the North Zone **FLOOD CONDITION 3** Boxes on the FRP Maps located in Appendix A.
ii. Review weather information and lake alerts provided from FCDMC.

Maricopa County Sherriff's Office

i. Monitor and barricade any roadways, trails and or recreational areas as needed.
i. Review weather information and lake alerts provided from FCDMC.

Peoria Flood Response Plan

FLOOD CONDITION 3 Operational Procedures Flowchart

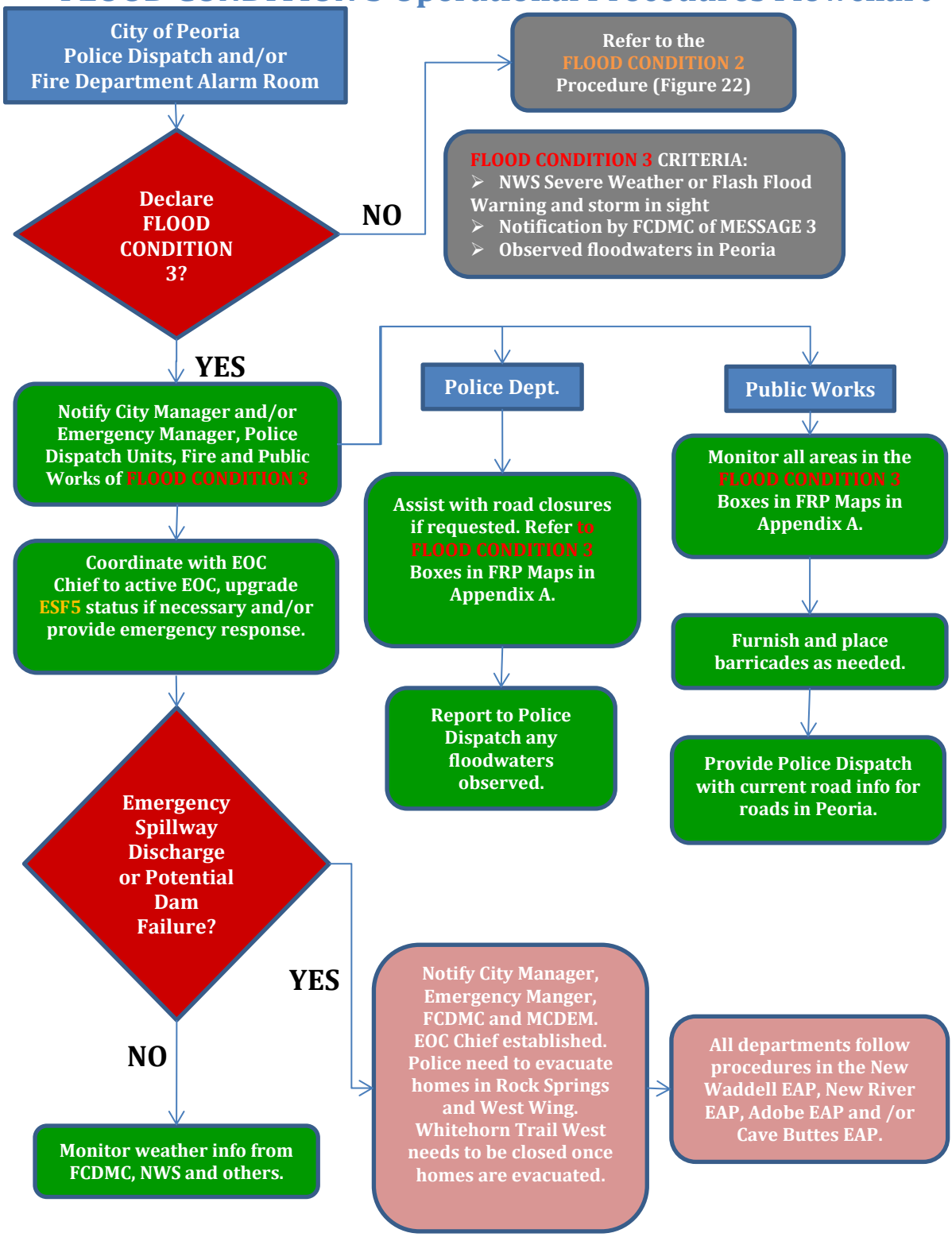


Figure 24 : FLOOD CONDITION 3 Flowchart

ALL CLEAR Procedures

Upon declaration of an ALL CLEAR by Flood Control District of Maricopa County or the National Weather Service that a flood threat has ended, the following tasks shall be performed (Figure 25):

Police Dispatch

i. Dispatch a police patrol unit and/or verify with an observer unit that a flood threat has passed.
ii. If a flood threat no longer exists, notify the EOC Chief, Police Patrol Units, Public Works, Community Services and Fire of the ALL CLEAR status.

Public Works Department

i. Remove any barricades, except as needed to barricade hazardous areas.
ii. Follow the existing procedure of post-event inspections of any city road crossing, bridge, trail or any other structure that is the City of Peoria's responsibility.

Community Services Department

i. Provide Public Works with and park information which can include but is not limited to observations, pictures, and assistance.
ii. Follow the existing procedure of post-event inspections of any city park.

Fire Department

i. Provide assistance to Police and Public Works as needed.

ALL CLEAR Procedures Flowchart

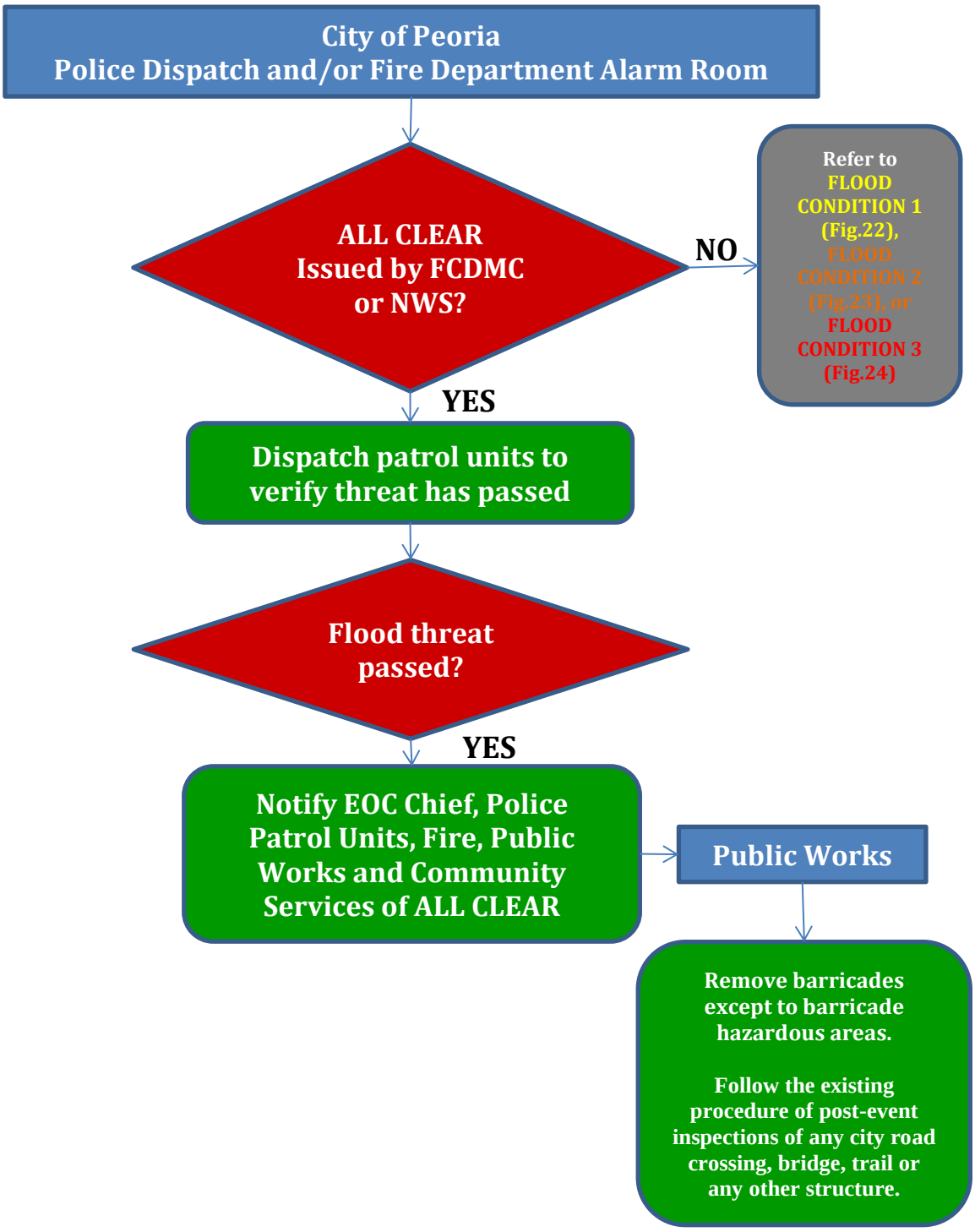


Figure 25 : ALL CLEAR Flowchart

POST FLOOD ACTIONS

After a flood has passed and an ALL CLEAR has been issued, refer to the Basic Plan for post-flood recovery operations.

TRAINING, EXERCISES, AND UPDATES

A successful FRP is a result of the preparedness and coordination of all its participants. The following tasks should be performed routinely to ensure that the Peoria FRP is effective in the event of a real emergency.

Training

An initial training/review session with the all the City and any other agencies involved in the FRP is recommended. Training would include an overview of the FRP which would cover flood detection, flood threat recognition, dissemination of information, emergency response action and post flood actions. This overview would also include specific notification protocols, geographic coverage (watercourses included within the drainage area), locations of concern and an overview of any maps or custom products that were created for this FRP.

Exercises

It is recommended that a table top exercise be conducted annually prior to the start of monsoon season. All departments and agencies within this FRP should participate. Within two weeks after the exercise, hold a post-drill critique meeting with all departments and agencies within this FRP to review procedures and identify any necessary improvements to the Peoria FRP.

FRP Updates

The Peoria FRP is reviewed annually by the District and MCDEM and modifications should be made accordingly, which includes notification data. These revisions are distributed to all participating departments and agencies by the District.

ALERT Gauge Network

The Flood Control District of Maricopa County operates a 24-hour rain, stream and weather gauge network which provides “real-time” information to the County and many other agencies about rainfall, floods and weather conditions in Maricopa County. This network operates in the National Weather Service ALERT (Automated Local Evaluation in Real Time) format and is commonly referred to as an ALERT system.

Early detection of a storm event and closely monitoring a storm can reduce the risk of injury, loss of life and property damage from flooding. To improve the usefulness of warnings it is recommended that

additional precipitation, stream, crest, and staff gauges be installed. Actual locations of gauges will be dependent on land ownership and availability, site access, vulnerability to vandalism, absence of obstructions and an accessible radio path.

Although some stream gauge sites have limited ability to enhance lead time, they remain an important component in the FRP because they can provide additional information. Crest gauges are used to gather data from streams and washes that are subject to infrequent, but severe flooding. A crest gauge is a cost-effective way of gathering peak flow data which can be used in emergency planning, emergency design and hydrologic analysis.

There are some locations in the City where responders would benefit from more rainfall and streamflow information. It is recommended that a rain/stream gauge is installed along Twin Buttes Wash at the bridge on Vistancia Blvd. An additional rain gauge which is northwest of this location along Lone Mountain Parkway would give additional rainfall information for the area.

Staff Gauges

A staff gauge can be installed near a roadway or pedestrian crossing to provide an estimate of the amount of water flowing over the road or walkway. In order for the staff gauges to read properly during an event, the sediment deposited would need to be removed prior to the barricades being removed from the roadway after a flow event. Once inspected and cleared of debris they would be able to display water level accurately during the next storm event. If these aren't cleared of debris the staff gauges would not give accurate measurements and may cause local residents to become overly confident when the condition is in fact unsafe.

There are currently 8 locations with staff gauges within Peoria FRP that the District observes and maintains. These staff gauges are located at:

- New River Dam http://alert.fcd.maricopa.gov/alert/Teams/0501P.htm
- Agua Fria River at Jomax http://alert.fcd.maricopa.gov/alert/Teams/0504S.htm
- New River at Bell Road http://alert.fcd.maricopa.gov/alert/Teams/0507S.htm
- New River at Grand Ave. http://alert.fcd.maricopa.gov/alert/Teams/0406P.htm
- New River at Olive http://alert.fcd.maricopa.gov/alert/Teams/0407P.htm
- 99th Ave. and Olive Side Channel http://alert.fcd.maricopa.gov/alert/Teams/0411S.htm
- Skunk Creek at 83rd Avenue http://alert.fcd.maricopa.gov/alert/Teams/0511S.htm
- ACDC Control Outlet http://alert.fcd.maricopa.gov/alert/Teams/1201P.htm

It is recommended that the City install staff gauges in several locations. These staff gauges would be monitored and maintained by the City. These locations are:

- New River at Happy Valley
- New River at Deer Valley
- New River at Union Hills

- Rock Springs Creek at Jomax
- Vistancia Blvd at Twin Buttes Wash
- Lone Mountain Road at Caterpillar Tank Wash
- SR-74 at Agua Fria River
- Loop 303 at Caterpillar Tank Wash
- Loop 303 at New River
- Loop 303 at Agua Fria River

Public Education

It is critical that the residents within the City of Peoria and specifically the Peoria FRP be educated and reminded of the inherent flood hazards around them. New residents may be unfamiliar and current residents may not have experienced a severe flash flood. It is important to let residents know if there may be potential for a flood event so they can avoid driving which will eliminate vehicle traffic and loss of access on the roadways. The District broadcasts commercials and advertisements that are seen throughout the Maricopa County area to help educate and make residents aware of the inherent danger of flooding. The District's website is a public website which has all the ALERT gauge data. The District encourages participating agencies and the public to observe and monitor the ALERT gauge data in the event of a flood.

The District has provided the Peoria FRP, a wall map and field maps to the departments and agencies involved. This will enable emergency response teams to become more familiar with the areas of concern and in return the community will benefit.

It is recommended that the City of Peoria develop pamphlets or other printed material which explains the dangers of flooding within Peoria, general flood response procedure, and what users should do if notified of a potential flood. The City should also identify adjacent neighborhoods, churches, groups, associations and commercial developments and distribute pamphlets before the start of monsoon season.

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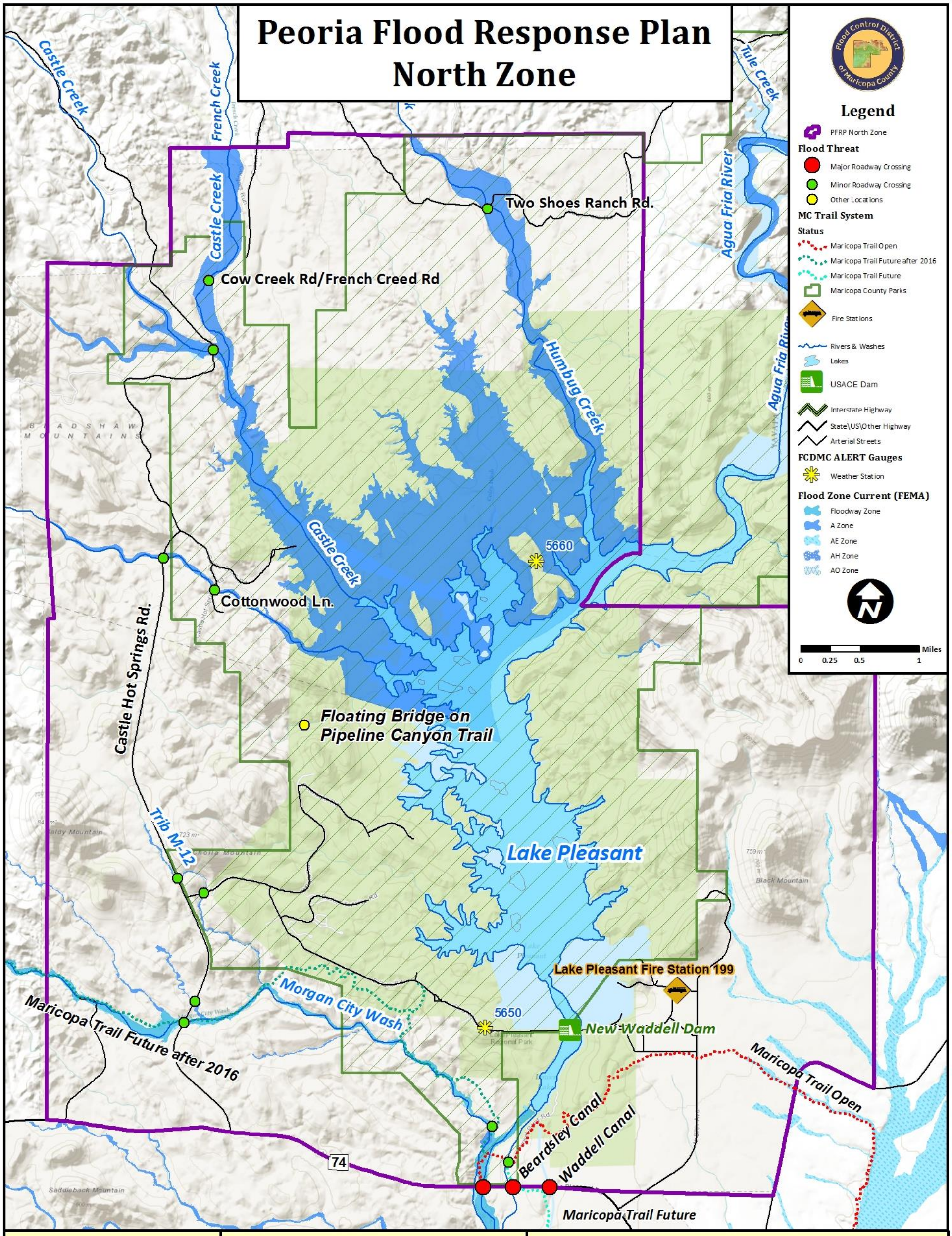
Appendix A

Flood Response Plan Flood Condition Maps

Peoria Flood Response Plan
North Zone



FLOOD CONDITION 1

Concern: All Recreational Areas

- Monitor recreational areas which include camping, hiking, and boating.
- Monitor and barricade the floating bridge along Pipleline Canyon Trail if needed.

FLOOD CONDITION 2

Concern: All Recreational Areas, Road Crossings

- Monitor recreational areas which include camping, hiking, and boating.
- Monitor and barricade the floating bridge along Pipleline Canyon Trail if needed.
- MCSO monitor minor road crossing(s) on Humbug Creek, Castle Creek, West Castle Creek, Cottonwood Creek at Cottonwood Ln., Trib M-12 and Maricopa Trail. Barricade if needed.
- Peoria police monitor minor road crossing(s) on Cottonwood Creek at Castle Hot Springs Rd., Morgan City Wash and Maricopa Trail. Barricade if needed.

FLOOD CONDITION 3

Concern: Recreational Areas, Road Crossings, New Waddell Dam

- Monitor recreational areas which include camping, hiking, and boating.
- Monitor and barricade the floating bridge along Pipleline Canyon Trail if needed.
- MCSO monitor minor road crossing(s) on Humbug Creek, Castle Creek, West Castle Creek, Cottonwood Creek at Cottonwood Ln., and Trib M-12. Barricade if needed.
- Peoria police monitor minor road crossing(s) on Cottonwood Creek at Castle Hot Springs Rd., Morgan City Wash and Maricopa Trail. Barricade if needed.
- Monitor major road crossings at SR 74 Agua Fria, Beardsley Canal and Waddell Canal. Barricade if needed.

Peoria Flood Response Plan West Zone

FLOOD CONDITION 1
Concern: Vistancia Recreational Areas Trails, Trilogy and Blackstone Golf Courses
- Monitor recreational areas. Barricade if needed.
- Monitor golf cart trails along Trilogy and Blackstone Golf Courses. Barricade if needed.

FLOOD CONDITION 2
Concern: Vistancia Recreational Areas Trails, Road Crossings, Trilogy and Blackstone Golf Courses
- Monitor recreational areas. Barricade if needed.
- Monitor Trilogy and Blackstone Golf Courses. Barricade if needed.
- Monitor minor road crossings on 16 East Wash, White Peak Wash, Twin Buttes Wash, E and W Garambullo Wash, Caterpillar Tank Wash and Carefree Hwy. Barricade if needed.

FLOOD CONDITION 3
Concern: Vistancia Recreational Areas Trails, Road Crossings, Trilogy and Blackstone Golf Courses
- Monitor recreational areas. Barricade if needed.
- Monitor Trilogy and Blackstone Golf Courses. Barricade if needed.
- Monitor minor road crossings on 16 East Wash, White Peak Wash, Twin Buttes Wash, E and W Garambullo Wash, Caterpillar Tank Wash and Carefree Hwy. Barricade if needed.
- Monitor major road crossings on SR 74, Loop 303, Caterpillar Tank Wash, Vistancia Blvd. and Beardsley Canal. Barricade if needed.
- Monitor Schools and Parks along White Peak Wash and West Fork White Peak Wash. Evacuate if needed.
- Access may be cut off at Vistancia Blvd. Bridges. Use Lone Mtn Parkway as an alternative route.

PW Trib A
PW Trib B
PW Trib C West
PW Trib C East
Unnmaed Wash No.2
Wash Tributary 2
Paddelford Wash
Saddleback Mountain
Beardsley Canal
Agua Fria River
Other Future Trails
Twin Buttes Wash
E. Garambullo Wash
West Fork White Peak Wash
White Peak Wash
Caterpillar Tank Wash
Lake Pleasant Elementary
Lone Mtn. Pkwy
Vistancia Trails
Blackstone Golf Course
Vistancia Elementary
N. Trilogy Blvd
Vistancia Blvd
Vistancia Blvd. Bridges
16 East Wash
Vistancia Fire Station 196
Trilogy Golf Course
Maricopa Trail Future
5470
N 155th Ave.
Jomax Rd
303

Legend

PFRP West Zone

Flood Threat
- Major Roadway Crossing
- Minor Roadway Crossing
- Other Locations

MC Trail System
- Maricopa Trail Future
- Other Future Trails

City of Peoria Trails
- Vistancia Walking Trails
- City of Peoria Parks

Structures in a FEMA FloodZone
- Commercial & Sheds
- Shed
- Schools
- Fire Stations
- Medicial Facilities

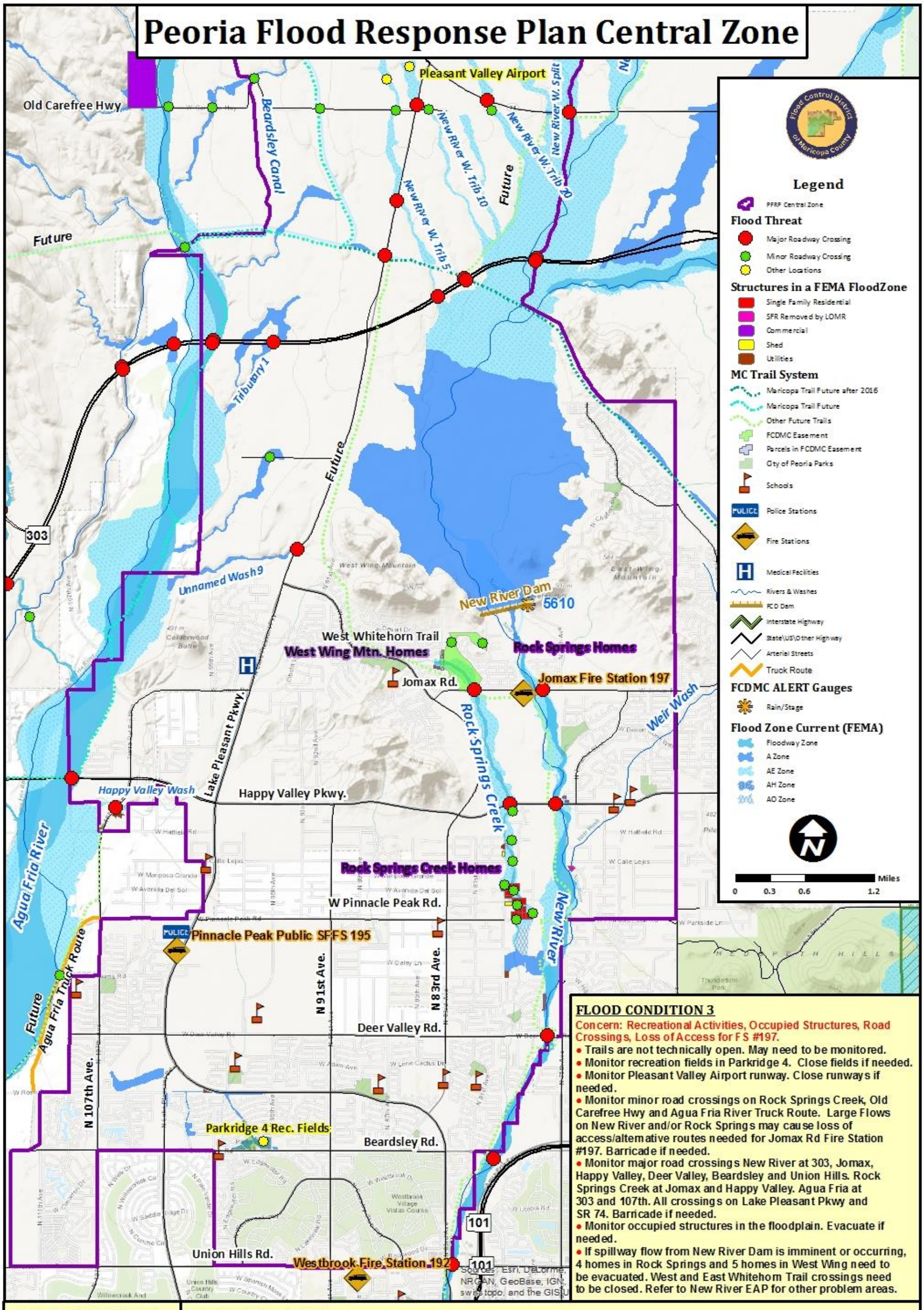
- Rivers & Washes
- Interstate Highway
- State\US\Other Highway
- Arterial Streets

FCDMC ALERT Gauges
- Rain Gauge

Flood Zone Current (FEMA)
- Floodway Zone
- A Zone
- AE Zone
- AH Zone
- AO Zone

Miles
0 0.35 0.7 1.4

Peoria Flood Response Plan Central Zone



Legend

PFRP Central Zone

Flood Threat

- Major Roadway Crossing
- Minor Roadway Crossing
- Other Locations

Structures in a FEMA FloodZone

- Single Family Residential
- SFR Removed by LOMR
- Commercial
- Shed
- Utilities

MC Trail System

- Maricopa Trail Future after 2016
- Maricopa Trail Future
- Other Future Trails
- FCDMC Easement
- Parcels in FCDMC Easement
- City of Peoria Parks
- Schools
- Police Stations
- Fire Stations
- Medical Facilities
- Rivers & Washes
- FCD Dam
- Interstate Highway
- State\US\Other Highway
- Arterial Streets
- Truck Route

FCDMC ALERT Gauges

- Rain/Stage

Flood Zone Current (FEMA)

- Floodway Zone
- A Zone
- AE Zone
- AH Zone
- AO Zone

Miles: 0 0.3 0.6 1.2

FLOOD CONDITION 3

Concern: Recreational Activities, Occupied Structures, Road Crossings, Loss of Access for F S #197.

- Trails are not technically open. May need to be monitored.
- Monitor recreation fields in Parkridge 4. Close fields if needed.
- Monitor Pleasant Valley Airport runway. Close runways if needed.
- Monitor minor road crossings on Rock Springs Creek, Old Carefree Hwy and Agua Fria River Truck Route. Large Flows on New River and/or Rock Springs may cause loss of access/alternative routes needed for Jomax Rd Fire Station #197. Barricade if needed.
- Monitor major road crossings New River at 303, Jomax, Happy Valley, Deer Valley, Beardsley and Union Hills. Rock Springs Creek at Jomax and Happy Valley. Agua Fria at 303 and 107th. All crossings on Lake Pleasant Pkwy and SR 74. Barricade if needed.
- Monitor occupied structures in the floodplain. Evacuate if needed.
- If spillway flow from New River Dam is imminent or occurring, 4 homes in Rock Springs and 5 homes in West Wing need to be evacuated. West and East Whitehorn Trail crossings need to be closed. Refer to New River EAP for other problem areas.

FLOOD CONDITION 1

Concern: Recreational Activities

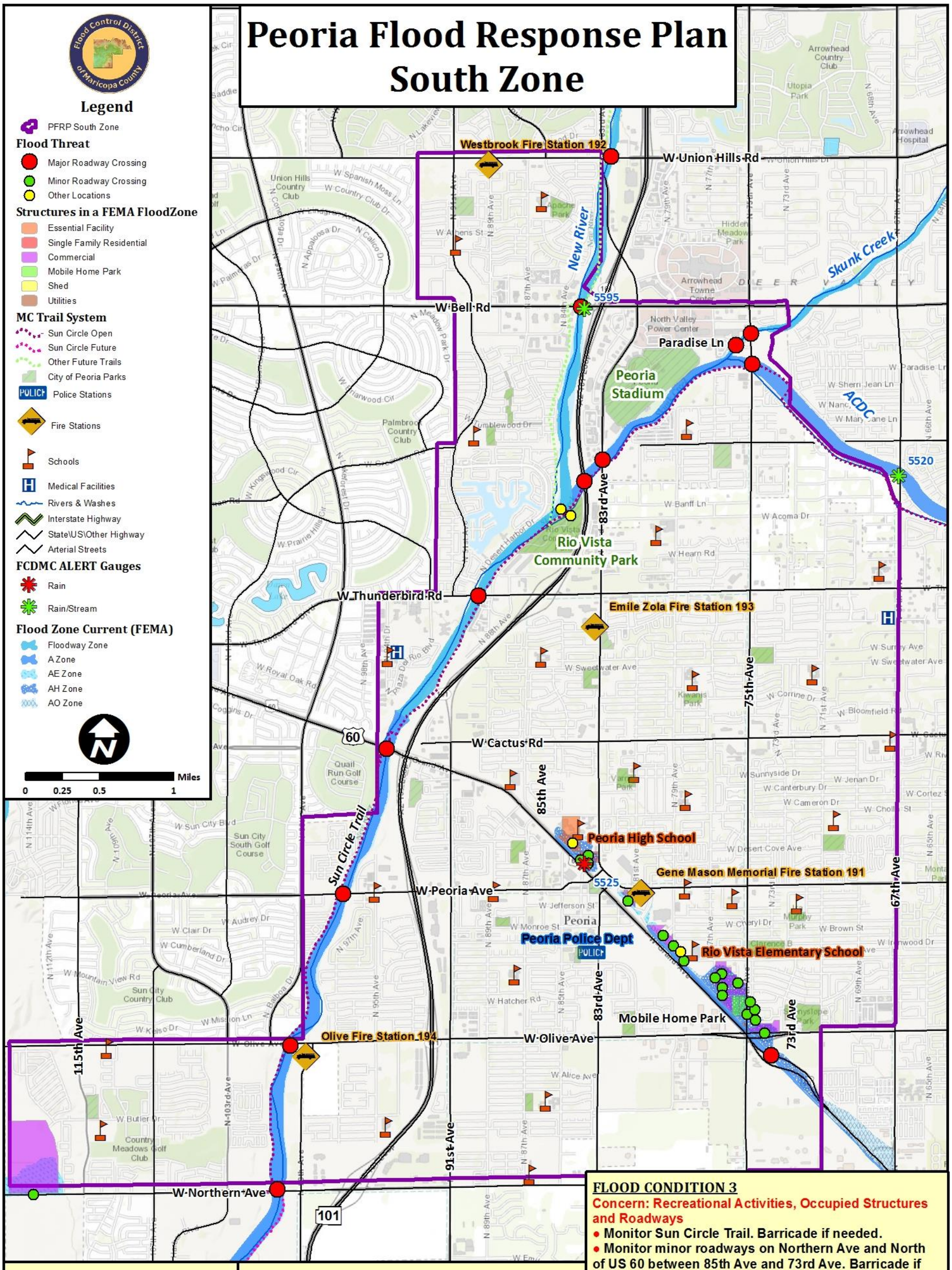
- Trails are not technically open. May need to be monitored.

FLOOD CONDITION 2

Concern: Recreational Activities, Occupied Structures, Road Crossings, Loss of Access for F S #197.

- Trails are not technically open. May need to be monitored.
- Monitor recreation fields in Parkridge 4.
- Monitor Pleasant Valley Airport runway.
- Monitor minor road crossings on Rock Springs Creek, Old Carefree Hwy and Agua Fria River Truck Route. Large Flows on New River and/or Rock Springs may cause loss of access/alternative routes needed for Jomax Rd Fire Station #197. Barricade if needed.
- Monitor occupied structures in the floodplain.
- If spillway flow from New River Dam is imminent or occurring, 4 homes in Rock Springs and 5 homes in West Wing need to be evacuated. West and East Whitehorn Trail crossings need to be closed. Refer to New River EAP for other problem areas.

Peoria Flood Response Plan
South Zone



FLOOD CONDITION 1

Concern: Recreational Activities

- Monitor Sun Circle Trail. Barricade if needed.

FLOOD CONDITION 2

Concern: Recreational Activities, Occupied Structures and Roadways

- Monitor Sun Circle Trail. Barricade if needed.
- Monitor minor roadways on Northern Ave and North of US 60 between 85th Ave and 73rd Ave. Barricade if needed.
- Monitor Rio Vista Park, PHS recreation field, Rio Vista Elementary School fields. Barricade/Evacuate area if needed.
- Monitor Mobile Home Park, PHS, and all structures in the floodplain north of US60 between 85th Ave and 73rd Ave. Barricade/Evacuate area if needed.

FLOOD CONDITION 3

Concern: Recreational Activities, Occupied Structures and Roadways

- Monitor Sun Circle Trail. Barricade if needed.
- Monitor minor roadways on Northern Ave and North of US 60 between 85th Ave and 73rd Ave. Barricade if needed.
- Monitor Rio Vista Park, PHS recreation field, Rio Vista Elementary School field. Barricade/Evacuate area if needed.
- Monitor Mobile Home Park, PHS, all structures in the floodplain north of US 60 between 85th Ave and 73rd Ave and Pioneer Landscaping along Agua Fria. Barricade/Evacuate area if needed.
- Monitor major roadways New River at Bell, Thunderbird, US60, Peoria, Olive, Northern. Skunk Creek at 75th Ave, Paradise Ln., 83rd Ave., Loop 101. ACDC at 75th. BNSF RR Underpass/Bridge. Barricade if needed.

APPENDIX B

Updates to the PRFP

Updates to the PFRP	
Item Modified	**Revision Date**
Notification Data & South Zone Map	12/10/2013

Table 18: Updates to the Peoria FRP

APPENDIX C

Notification Data

Peoria FRP Notification Data			
	Organization	**Name/Title**	**Contact Information**
Peoria	Engineering Department	Andy Granger	Andrew.Granger@peoriaaz.gov
		Burton Charron	623-773-7237 (office) Burton.Charron@peoriaaz.gov
	GIS Department	Timothy Smothers, GIS Supervisor	623-773-7671 (Direct) timothy.smothers@peoriaaz.gov
	Fire Department	Glenn Jones	623-773-5207 (office) 602-882-3513 (cell) Glenn.Jones@peroiaaz.gov
	Planning and Community Development	Chris Jacques	Chris.Jacques@peoriaaz.gov
	Peoria Police Department	Ken Gentry	623-773-8580 (office) Ken.Gentry@peoriaaz.gov
	Peoria Fire Department	Stacy Irvine, Deputy Fire Chief	623-773-7905 (office) Stacy.Irvine@peoriaaz.gov
	Public Works – Utilities	Mike Weber	623-773-7181 (office) Mike.Weber@peoriaaz.gov
		Maher Hazine	Maher.Hazine@peoriaaz.gov
	Community Services - Parks Specially	Brenda Rehnke	Brenda.Rehnke@peoriaaz.gov
Maricopa County Parks and Recreation	Planning and Development	Michele Kogl P.E., Planning and Development Manager	602-506-2930 ***PRIMARY*** 602-506-4739 (office) michelekogl@mail.maricopa.gov
		Fareed Abou-Haidar , GIS Technician	602-506-6323 (office) fareedabouhaidar@mail.maricopa.gov
ADOT	24-hr Traffic Operations Center (TOC)		602-257-1563
		Courtney Perrier-Bear, Emergency Manager Coordinator	602-712-2988 (office) 520-262-3856 (cell) cperrier-bear@azdot.gov
Maricopa County Sheriff's Office	Dispatch		602-876-1030 1-800-352-4553 Public Toll Free 602-876-1011 Public
	Dispatch Contact	Kathy Downing	K_Downing@MCSO.Maricopa.gov
NWS	24-hr	Lead Forecaster	602-275-7004 or 602-275-7003
FCDMC	ALERT Room		602-506-8701 or 602-272-0132
	Flood Warning Branch	Steve Waters, Manager	602-390-7804 (cell) 480-345-0771 (home)
		Dan Henz, Meteorologist	602-768-2000 (cell)

APPENDIX D
LOMR-F's and Elevation Certificates

Page 1 of 2		Date: January 29, 2009	Case No.: 09-09-0096A	LOMR-FW

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION FLOODWAY DETERMINATION DOCUMENT (REMOVAL)

COMMUNITY AND MAP PANEL INFORMATION		LEGAL PROPERTY DESCRIPTION
COMMUNITY	CITY OF PEORIA, MARICOPA COUNTY, ARIZONA	Lot 168, Fletcher Heights, Phase 2B-3, as shown on the Final Plat recorded as Document No. 2002-0922832 in Book 604, Page 39, in the Office of the Recorder, Maricopa County, Arizona (APN:200-07-687)
	COMMUNITY NO.: 040050	
AFFECTED MAP PANEL	NUMBER: 04013C1190H	
	DATE: 9/30/2005	
FLOODING SOURCE: NEW RIVER		APPROXIMATE LATITUDE & LONGITUDE OF PROPERTY: 33.686, -112.223 SOURCE OF LAT & LONG: PRECISION MAPPING STREETS 8.0 DATUM: NAD 83

DETERMINATION

LOT	BLOCK/ SECTION	SUBDIVISION	STREET	OUTCOME WHAT IS REMOVED FROM THE SFHA	FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NGVD 29)	LOWEST ADJACENT GRADE ELEVATION (NGVD 29)	LOWEST LOT ELEVATION (NGVD 29)
168	--	Fletcher Heights	22313 North 76th Drive	Structure	X (shaded)	1287.1 feet	1289.4 feet	--

Special Flood Hazard Area (SFHA) - The SFHA is an area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).

ADDITIONAL CONSIDERATIONS (Please refer to the appropriate section on Attachment 1 for the additional considerations listed below.)

INADVERTENT INCLUSION FLOODWAY 1
PORTIONS REMAIN IN THE SFHA
REVISED BY LETTER OF MAP REVISION

This document provides the Federal Emergency Management Agency's determination regarding a request for a Letter of Map Revision for the property described above. Using the information submitted and the effective National Flood Insurance Program (NFIP) map, we have determined that the structure(s) on the property(ies) is/are not located in the NFIP regulatory floodway or the SFHA, an area inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). This document revises the effective NFIP map to remove the subject property from the NFIP regulatory floodway and the SFHA located on the effective NFIP map; therefore, the Federal mandatory flood insurance requirement does not apply. However, the lender has the option to continue the flood insurance requirement to protect its financial risk on the loan. A Preferred Risk Policy (PRP) is available for buildings located outside the SFHA. Information about the PRP and how one can apply is enclosed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, 3601 Eisenhower Avenue, Suite 130, Alexandria, VA 22304-6439.

William R Blanton Jr

William R. Blanton Jr., CFM, Chief
Engineering Management Branch
Mitigation Directorate

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION FLOODWAY DETERMINATION DOCUMENT (REMOVAL)

ATTACHMENT 1 (ADDITIONAL CONSIDERATIONS)

INADVERTENT INCLUSION IN THE FLOODWAY 1 (PORTIONS OF THE PROPERTY REMAIN IN THE FLOODWAY) (This Additional Consideration applies to the preceding 1 Property.)

A portion of this property is located within the National Flood Insurance Program (NFIP) regulatory floodway for the flooding source indicated on the Determination Document, while the subject of this determination is not. The NFIP regulatory floodway is the area that must remain unobstructed in order to prevent unacceptable increases in base flood elevations. Therefore, no construction may take place in an NFIP regulatory floodway that may cause an increase in the base flood elevation, and any future construction or substantial improvement on the property remains subject to Federal, State/Commonwealth, and local regulations for floodplain management. The NFIP regulatory floodway is provided to the community as a tool to regulate floodplain development. Therefore, the NFIP regulatory floodway modification described in the Determination Document, while acceptable to the Federal Emergency Management Agency (FEMA), must also be acceptable to the community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations. Any proposed revision to the NFIP regulatory floodway must be submitted to FEMA by community officials. The community should contact either the Regional Director (for those communities in Regions I-IV, and VI-X), or the Regional Engineer (for those communities in Region V) for guidance on the data which must be submitted for a revision to the NFIP regulatory floodway. Contact information for each regional office can be obtained by calling the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or from our web site at http://www.fema.gov/about/regoff.htm.

PORTIONS OF THE PROPERTY REMAIN IN THE SFHA (This Additional Consideration applies to the preceding 1 Property.)

Portions of this property, but not the subject of the Determination/Comment document, may remain in the Special Flood Hazard Area. Therefore, any future construction or substantial improvement on the property remains subject to Federal, State/Commonwealth, and local regulations for floodplain management.

REVISED BY LETTER OF MAP REVISION (This Additional Consideration applies to the preceding 1 Property.)

The effective National Flood Insurance Program map for the subject property, has since been revised by a Letter of Map Revision (LOMR) dated 10/26/2006. The 10/26/2006 LOMR has been used in making the determination/comment for the subject property.

This attachment provides additional information regarding this request. If you have any questions about this attachment, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, 3601 Eisenhower Avenue, Suite 130, Alexandria, VA 22304-6439.

William R Blanton Jr

William R. Blanton Jr., CFM, Chief
Engineering Management Branch
Mitigation Directorate

Page 1 of 2	Follows Conditional No.: 04-09-1639C	Date: April 18, 2005	Case No.: 05-09-0596A	LOMR-F

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION BASED ON FILL DETERMINATION DOCUMENT (REMOVAL)

COMMUNITY AND MAP PANEL INFORMATION		LEGAL PROPERTY DESCRIPTION
COMMUNITY	CITY OF PEORIA, MARICOPA COUNTY, ARIZONA	Lots 12, 13 and 19, Copper Creek Estates, as shown on the Plat recorded as Document No. 2004-0789015 in Book 694, Page 19, in the Office of the Recorder, Maricopa County, Arizona
	COMMUNITY NO.: 040050	
AFFECTED MAP PANEL	NUMBER: 04013C1180F	
	NAME: MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS	
	DATE: 7/19/2001	
FLOODING SOURCE: NEW RIVER		APPROXIMATE LATITUDE & LONGITUDE OF PROPERTY: 33.703, -112.218 SOURCE OF LAT & LONG: PRECISION MAPPING STREETS 7.0 DATUM: NAD 83

DETERMINATION

LOT	BLOCK/ SECTION	SUBDIVISION	STREET	OUTCOME WHAT IS REMOVED FROM THE SFHA	FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NGVD 29)	LOWEST ADJACENT GRADE ELEVATION (NGVD 29)	LOWEST LOT ELEVATION (NGVD 29)
12	—	Copper Creek Estates	—	Property	X (shaded)	1322.8 feet	—	1323.9 feet

Special Flood Hazard Area (SFHA) - The SFHA is an area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).

ADDITIONAL CONSIDERATIONS (Please refer to the appropriate section on Attachment 1 for the additional considerations listed below.)

DETERMINATION TABLE (CONTINUED)

FILL RECOMMENDATION

This document provides the Federal Emergency Management Agency's determination regarding a request for a Letter of Map Revision based on Fill for the property described above. Using the information submitted and the effective National Flood Insurance Program (NFIP) map, we have determined that the property(ies) is/are not located in the SFHA, an area inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). This document revises the effective NFIP map to remove the subject property from the SFHA located on the effective NFIP map; therefore, the Federal mandatory flood insurance requirement does not apply. However, the lender has the option to continue the flood insurance requirement to protect its financial risk on the loan. A Preferred Risk Policy (PRP) is available for buildings located outside the SFHA. Information about the PRP and how one can apply is enclosed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, 3601 Eisenhower Avenue, Suite 600, Alexandria, VA 22304-6439.

Doug Bellomo, P.E., CFM, Chief
Hazard Identification Section, Mitigation Division
Emergency Preparedness and Response Directorate

Version 1.3.3 1029299.1LOMR-F-ML097520596

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION BASED ON FILL DETERMINATION DOCUMENT (REMOVAL)

ATTACHMENT 1 (ADDITIONAL CONSIDERATIONS)

DETERMINATION TABLE (CONTINUED)

LOT	BLOCK/ SECTION	SUBDIVISION	STREET	OUTCOME WHAT IS REMOVED FROM THE SFHA	FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NGVD 29)	LOWEST ADJACENT GRADE ELEVATION (NGVD 29)	LOWEST LOT ELEVATION (NGVD 29)
13	—	Copper Creek Estates	—	Property	X (shaded)	1322.3 feet	—	1323.4 feet
19	—	Copper Creek Estates	—	Property	X (shaded)	1317.8 feet	—	1318.8 feet

FILL RECOMMENDATION (This Additional Consideration applies to the preceding 3 Properties.)

The minimum NFIP criteria for removal of the subject area based on fill have been met for this request and the community in which the property is located has certified that the area and any subsequent structure(s) built on the filled area are reasonably safe from flooding. FEMA's Technical Bulletin 10-01 provides guidance for the construction of buildings on land elevated above the base flood elevation through the placement of fill. A copy of Technical Bulletin 10-01 can be obtained by calling the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or from our web site at http://www.fema.gov/mit/tb1001.pdf. Although the minimum NFIP standards no longer apply to this area, some communities may have floodplain management regulations that are more restrictive and may continue to enforce some or all of their requirements in areas outside the Special Flood Hazard Area.

This attachment provides additional information regarding this request. If you have any questions about this attachment, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, 3601 Eisenhower Avenue, Suite 600, Alexandria, VA 22304-6439.

Doug Bellomo, P.E., CFM, Chief
Hazard Identification Section, Mitigation Division
Emergency Preparedness and Response Directorate

Page 1 of 2		Date: June 28, 2012	Case No.: 12-09-1984A	LOMR-F

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION BASED ON FILL DETERMINATION DOCUMENT (REMOVAL)

COMMUNITY AND MAP PANEL INFORMATION		LEGAL PROPERTY DESCRIPTION
COMMUNITY	CITY OF PEORIA, MARICOPA COUNTY, ARIZONA	Lots 11 through 16, Westwing Mountain Parcel 9, as shown on the Plat recorded as Document No. 2001-0725990, in Book 569, Page 31, in the Office of the Recorder, Maricopa County, Arizona
	COMMUNITY NO.: 040050	
AFFECTED MAP PANEL	NUMBER: 04013C1180G	
	DATE: 9/30/2005	
FLOODING SOURCE: ROCK SPRINGS CREEK		APPROXIMATE LATITUDE & LONGITUDE OF PROPERTY: 33.728, -112.239 SOURCE OF LAT & LONG: GOOGLE EARTH PRO DATUM: NAD 83

DETERMINATION

LOT	BLOCK/ SECTION	SUBDIVISION	STREET	OUTCOME WHAT IS REMOVED FROM THE SFHA	FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NGVD 29)	LOWEST ADJACENT GRADE ELEVATION (NGVD 29)	LOWEST LOT ELEVATION (NGVD 29)
11	--	Westwing Mountain Parcel 9	8338 West Maya Drive	Property	X (shaded)	--	1381.0 feet	1380.2 feet

Special Flood Hazard Area (SFHA) - The SFHA is an area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).

ADDITIONAL CONSIDERATIONS (Please refer to the appropriate section on Attachment 1 for the additional considerations listed below.)

DETERMINATION TABLE (CONTINUED)
STUDY UNDERWAY

This document provides the Federal Emergency Management Agency's determination regarding a request for a Letter of Map Revision based on Fill for the property described above. Using the information submitted and the effective National Flood Insurance Program (NFIP) map, we have determined that the property(ies) is/are not located in the SFHA, an area inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). This document revises the effective NFIP map to remove the subject property from the SFHA located on the effective NFIP map; therefore, the Federal mandatory flood insurance requirement does not apply. However, the lender has the option to continue the flood insurance requirement to protect its financial risk on the loan. A Preferred Risk Policy (PRP) is available for buildings located outside the SFHA. Information about the PRP and how one can apply is enclosed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, Engineering Library, 847 South Pickett Street, Alexandria, VA 22304-4605.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION BASED ON FILL
DETERMINATION DOCUMENT (REMOVAL)

ATTACHMENT 1 (ADDITIONAL CONSIDERATIONS)

DETERMINATION TABLE (CONTINUED)

LOT	BLOCK/ SECTION	SUBDIVISION	STREET	**OUTCOME** WHAT IS REMOVED FROM THE SFHA	FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NGVD 29)	LOWEST ADJACENT GRADE ELEVATION (NGVD 29)	LOWEST LOT ELEVATION (NGVD 29)
12	--	Westwing Mountain Parcel 9	8336 West Maya Drive	Property	X (shaded)	--	1380.6 feet	1380.0 feet
13	--	Westwing Mountain Parcel 9	8334 West Maya Drive	Property	X (shaded)	--	1380.4 feet	1379.5 feet
14	--	Westwing Mountain Parcel 9	8332 West Maya Drive	Property	X (shaded)	1378.1 feet	1380.0 feet	1378.8 feet
15	--	Westwing Mountain Parcel 9	8330 West Maya Drive	Property	X (shaded)	1377.7 feet	1379.5 feet	1378.6 feet
16	--	Westwing Mountain Parcel 9	26941 North 83rd Drive	Property	X (shaded)	1377.0 feet	1379.2 feet	1378.5 feet

STUDY UNDERWAY (This Additional Consideration applies to all properties in the LOMR-F DETERMINATION DOCUMENT (REMOVAL))

This determination is based on the flood data presently available. However, the Federal Emergency Management Agency is currently revising the National Flood Insurance Program (NFIP) map for the community. New flood data could be generated that may affect this property. When the new NFIP map is issued it will supersede this determination. The Federal requirement for the purchase of flood insurance will then be based on the newly revised NFIP map.

This attachment provides additional information regarding this request. If you have any questions about this attachment, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, Engineering Library, 847 South Pickett Street, Alexandria, VA 22304-4605.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

LOMR-APP 13-09-0215P

Page 1 of 5	Issue Date: May 30, 2013	Effective Date: October 11, 2013	Case No.: 13-09-0215P	LOMR-APP

Follows Conditional Case No.: 05-09-0091R

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City of Peoria Maricopa County Arizona	CHANNELIZATION	HYDRAULIC ANALYSIS HYDROLOGIC ANALYSIS NEW TOPOGRAPHIC DATA
	COMMUNITY NO.: 040050		
IDENTIFIER	Tierra Del Rio North Hardbank	APPROXIMATE LATITUDE & LONGITUDE: 33.742, -112.271 SOURCE: Precision Mapping Streets DATUM: NAD 83	

ANNOTATED MAPPING ENCLOSURES	ANNOTATED STUDY ENCLOSURES
TYPE: FIRM* NO.: 04013C1160H DATE: September 30, 2005	DATE OF EFFECTIVE FLOOD INSURANCE STUDY REPORT: September 30, 2005 PROFILE(S): 1706P SUMMARY OF DISCHARGES TABLE: 3

Enclosures reflect changes to flooding sources affected by this revision.
* FIRM - Flood Insurance Rate Map; ** FBFM - Flood Boundary and Floodway Map; *** FHBM - Flood Hazard Boundary Map

FLOODING SOURCE(S) & REVISED REACH(ES)

Unnamed Wash 9 - from the confluence with the Agua Fria River to approximately 4,150 feet upstream

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Unnamed Wash 9	Zone A	Zone AE	YES	YES
	No BFEs*	BFEs	YES	NONE

* BFEs - Base Flood Elevations

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

132942 PT202.BKR.13090215P.H20 102-I-A-C

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

OTHER COMMUNITIES AFFECTED BY THIS REVISION

CID Number: 040037 **Name:** Maricopa County, Arizona

AFFECTED MAP PANELS	AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT
TYPE: FIRM* NO.: 04013C1160H DATE: September 30, 2005	DATE OF EFFECTIVE FLOOD INSURANCE STUDY REPORT: September 30, 2005 PROFILE(S): 1706P SUMMARY OF DISCHARGES TABLE: 3

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

132942 PT202.BKR.13090215P.H20 102-I-A-C

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

NFIP regulations Subparagraph 60.3(b)(7) requires communities to ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management ordinances; therefore, responsibility for maintenance of the altered or relocated watercourse, including any related appurtenances such as bridges, culverts, and other drainage structures, rests with your community. We may request that your community submit a description and schedule of maintenance activities necessary to ensure this requirement.

COMMUNITY REMINDERS

We based this determination on the base (1-percent-annual-chance) discharges computed in the submitted hydrologic model. Future development of projects upstream could cause increased discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on discharges and could, therefore, indicate that greater flood hazards exist in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

132942 PT202.BKR.13090215P.H20 102-I-A-C

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Sally M. Ziolkowski
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7175

STATUS OF THE COMMUNITY NFIP MAPS

We are processing a FIRM and FIS report for Maricopa County, Arizona, and its incorporated areas in our countywide format. The new FIRM and FIS report, which include flood hazard information for your community, will become effective on October 16, 2013. We will not incorporate the modifications made by this LOMR into the new FIRM and FIS report before they become effective. Therefore, the modifications made by this LOMR will be superseded when the new FIRM and FIS report become effective. After the effective date, we will reissue this LOMR to revise the newly effective FIRM and FIS report.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

132942 PT202.BKR.13090215P.H20 102-I-A-C

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

PUBLIC NOTIFICATION

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below and through FEMA's Flood Hazard Mapping website at https://www.floodmaps.fema.gov/fhm/Scripts/bfe_main.asp.

LOCAL NEWSPAPER Name: *The Arizona Business Gazette*
Dates: June 6, 2013 and June 13, 2013

Within 90 days of the second publication in the local newspaper, a citizen may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination information presented in this LOMR may be changed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

132942 PT202.BKR.13090215P.H20 102-I-A-C

LOMR-APP 13-09-0216P

Page 1 of 4	Issue Date: May 16, 2013	Effective Date: September 27, 2013	Case No.: 13-09-0216P	LOMR-APP

Follows Conditional Case No.: 05-09-0091R

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	Maricopa County Arizona (Unincorporated Areas)	CHANNELIZATION FILL	FLOODWAY HYDRAULIC ANALYSIS NEW TOPOGRAPHIC DATA
	COMMUNITY NO.: 040037		
IDENTIFIER	Tierra Del Rio North Hardbank - Agua Fria River	APPROXIMATE LATITUDE & LONGITUDE: 33.734, -112.284 SOURCE: Precision Mapping Streets DATUM: NAD 83	

ANNOTATED MAPPING ENCLOSURES	ANNOTATED STUDY ENCLOSURES
TYPE: FIRM* NO.: 04013C1160H DATE: September 30, 2005	DATE OF EFFECTIVE FLOOD INSURANCE STUDY: September 30, 2005 PROFILE(S): 24P, 25P, AND 26P FLOODWAY DATA TABLE: 5

Enclosures reflect changes to flooding sources affected by this revision.
* FIRM - Flood Insurance Rate Map; ** FBFM - Flood Boundary and Floodway Map; *** FHBM - Flood Hazard Boundary Map

FLOODING SOURCE(S) & REVISED REACH(ES)

Agua Fria River - from approximately 740 feet downstream to approximately 11,040 feet upstream of West Happy Valley Road

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Agua Fria River	Zone AE	Zone AE	YES	YES
	BFEs*	BFEs	YES	YES
	Floodway	Floodway	YES	YES
	Zone A	Zone AE	NONE	YES

* BFEs - Base Flood Elevations

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

132942 PT202.BKR.13090216P.H20 102-I-A-C

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

We provide the floodway designation to your community as a tool to regulate floodplain development. Therefore, the floodway revision we have described in this letter, while acceptable to us, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

NFIP regulations Subparagraph 60.3(b)(7) requires communities to ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management ordinances; therefore, responsibility for maintenance of the altered or relocated watercourse, including any related appurtenances such as bridges, culverts, and other drainage structures, rests with your community. We may request that your community submit a description and schedule of maintenance activities necessary to ensure this requirement.

COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance flood discharges computed in the FIS for your community without considering subsequent changes in watershed characteristics that could increase flood discharges. Future development of projects upstream could cause increased flood discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on flood discharges subsequent to the publication of the FIS report for your community and could, therefore, establish greater flood hazards in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

132942 PT202.BKR.13090216P.H20 102-I-A-C

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

This revision has met our criteria for removing an area from the base (1-percent-annual-chance) floodplain to reflect the placement of fill. However, we encourage you to require that the lowest adjacent grade and lowest floor (including basement) of any structure placed within the subject area be elevated to or above the BFE.

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Sally M. Ziolkowski
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7175

STATUS OF THE COMMUNITY NFIP MAPS

We are processing a FIRM and FIS report for Maricopa County, Arizona, and its incorporated areas in our countywide format. The new FIRM and FIS report, which include flood hazard information for your community, will become effective on October 16, 2013. We will not incorporate the modifications made by this LOMR into the new FIRM and FIS report before they become effective. Therefore, the modifications made by this LOMR will be superseded when the new FIRM and FIS report become effective. After the effective date, we will reissue this LOMR to revise the newly effective FIRM and FIS report.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

132942 PT202.BKR.13090216P.H20 102-I-A-C

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

PUBLIC NOTIFICATION

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below and through FEMA's Flood Hazard Mapping website at https://www.floodmaps.fema.gov/fhm/Scripts/bfe_main.asp.

LOCAL NEWSPAPER Name: *The Arizona Business Gazette*
Dates: May 23, 2013 and May 30, 2013

Within 90 days of the second publication in the local newspaper, a citizen may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination information presented in this LOMR may be changed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

132942 PT202.BKR.13090216P.H20 102-I-A-C

LOMR-F 13-09-2227A

Page 1 of 2	Follows Conditional No.: 10-09-3576C	Date: June 20, 2013	Case No.: 13-09-2227A	LOMR-F

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION BASED ON FILL DETERMINATION DOCUMENT (REMOVAL)

COMMUNITY AND MAP PANEL INFORMATION		LEGAL PROPERTY DESCRIPTION
COMMUNITY	CITY OF PEORIA, MARICOPA COUNTY, ARIZONA	Lots 14 through 17, Replat of Terramar Parcel 9B, as shown on the Plat recorded as Instrument No. 2010-0887721, in Book 1066, Page 47, in the Office of the Recorder, Maricopa County, Arizona
	COMMUNITY NO.: 040050	
AFFECTED MAP PANEL	NUMBER: 04013C1180G	
	DATE: 9/30/2005	
FLOODING SOURCE: NEW RIVER		APPROXIMATE LATITUDE & LONGITUDE OF PROPERTY: 33.711, -112.220 SOURCE OF LAT & LONG: GOOGLE EARTH PRO DATUM: NAD 83

DETERMINATION

LOT	BLOCK/ SECTION	SUBDIVISION	STREET	OUTCOME WHAT IS REMOVED FROM THE SFHA	FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NGVD 29)	LOWEST ADJACENT GRADE ELEVATION (NGVD 29)	LOWEST LOT ELEVATION (NGVD 29)
14	-- 201 30 191	Replat of Terramar Parcel 9B	7480 West Crabapple Drive	Structure	X (shaded)	--	1339.1 feet	--

Special Flood Hazard Area (SFHA) - The SFHA is an area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).

ADDITIONAL CONSIDERATIONS (Please refer to the appropriate section on Attachment 1 for the additional considerations listed below.)

DETERMINATION TABLE (CONTINUED)
PORTIONS REMAIN IN THE SFHA
STUDY UNDERWAY

This document provides the Federal Emergency Management Agency's determination regarding a request for a Letter of Map Revision based on Fill for the property described above. Using the information submitted and the effective National Flood Insurance Program (NFIP) map, we have determined that the structure(s) on the property(ies) is/are not located in the SFHA, an area inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). This document revises the effective NFIP map to remove the subject property from the SFHA located on the effective NFIP map; therefore, the Federal mandatory flood insurance requirement does not apply. However, the lender has the option to continue the flood insurance requirement to protect its financial risk on the loan. A Preferred Risk Policy (PRP) is available for buildings located outside the SFHA. Information about the PRP and how one can apply is enclosed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION BASED ON FILL
DETERMINATION DOCUMENT (REMOVAL)

ATTACHMENT 1 (ADDITIONAL CONSIDERATIONS)

DETERMINATION TABLE (CONTINUED)

LOT	BLOCK/ SECTION	SUBDIVISION	STREET	OUTCOME WHAT IS REMOVED FROM THE SFHA	FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NGVD 29)	LOWEST ADJACENT GRADE ELEVATION (NGVD 29)	LOWEST LOT ELEVATION (NGVD 29)
15	-- 29 30 192	Replat of Terramar Parcel 9B	7470 West Crabapple Drive	Structure	X (shaded)	--	1339.2 feet	--
16	-- 29 30 193	Replat of Terramar Parcel 9B	7469 West Crabapple Drive	Structure	X (shaded)	--	1339.6 feet	--
17	-- 29 30 194	Replat of Terramar Parcel 9B	7455 West Crabapple Drive	Structure	X (shaded)	--	1340.0 feet	--

PORTIONS OF THE PROPERTY REMAIN IN THE SFHA (This Additional Consideration applies to the preceding 4 Properties.)

Portions of this property, but not the subject of the Determination/Comment document, may remain in the Special Flood Hazard Area. Therefore, any future construction or substantial improvement on the property remains subject to Federal, State/Commonwealth, and local regulations for floodplain management.

STUDY UNDERWAY (This Additional Consideration applies to all properties in the LOMR-F DETERMINATION DOCUMENT (REMOVAL))

This determination is based on the flood data presently available. However, the Federal Emergency Management Agency is currently revising the National Flood Insurance Program (NFIP) map for the community. New flood data could be generated that may affect this property. When the new NFIP map is issued it will supersede this determination. The Federal requirement for the purchase of flood insurance will then be based on the newly revised NFIP map.

This attachment provides additional information regarding this request. If you have any questions about this attachment, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Lot 164

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number
Company NAIC Number

A1. Building Owner's Name BGSS INVESTMENTS LLC

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
22377 NORTH 76TH DRIVE
City PEORIA State AZ ZIP Code 85383

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 200-07-683 LOT 164 FLETCHER HEIGHTS PHASE 2NB-3 BOOK 604 PAGE 39 MCR

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) RESIDENTIAL

A5. Latitude/Longitude: Lat. 33-41'12.8 Long. 112-13'22.7 Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1B

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s) _____ sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____
- c) Total net area of flood openings in A8.b _____ sq in
- d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:
- a) Square footage of attached garage 500 sq ft
- b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade 0
- c) Total net area of flood openings in A9.b 0 sq in
- d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
PEORIA 040050	MARICOPA	AZ

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
1190	H	9/30/2005	9/30/2005	AE	BFE=1287.15

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) LOMR EFF DATE 10/26/2006

B11. Indicate elevation datum used for BFE in Item B9: ☒ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) _____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date _____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.
Benchmark Utilized 47546-2MA Vertical Datum NGVD29
Conversion/Comments NGVD29=1290.59, CONVERTED TO NGVD29 DATUM USING VERTCON

			Check the measurement used.
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor)	1290.82	☒ feet ☐ meters (Puerto Rico only)
b)	Top of the next higher floor	_____	☐ feet ☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (V Zones only)	_____	☐ feet ☐ meters (Puerto Rico only)
d)	Attached garage (top of slab)	1290.27	☒ feet ☐ meters (Puerto Rico only)
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	1290.62	☒ feet ☐ meters (Puerto Rico only)
f)	Lowest adjacent (finished) grade next to building (LAG)	1290.08	☒ feet ☐ meters (Puerto Rico only)
g)	Highest adjacent (finished) grade next to building (HAG)	1290.28	☒ feet ☐ meters (Puerto Rico only)
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	_____	☐ feet ☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

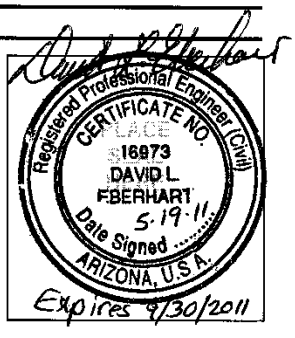
☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No

Certifier's Name DAVID L. EBERHART License Number 16973

Title PRESIDENT Company Name THUNDERBIRD CONSULTING GROUP, INC.

Address 6801 WEST ASTER DRIVE City PEORIA State AZ ZIP Code 85381

Signature David L. Eberhart Date 5-19-11 Telephone 623-412-0050



FEMA Form 81-31, Mar 09 — See reverse side for continuation — Replaces all previous editions

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number
Company NAIC Number

A1. Building Owner's Name KEVIN AND MARY MAHONEY

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
22361 NORTH 76TH DRIVE
City PEORIA State AZ ZIP Code 85383

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 200-07-684 LOT 165 FLETCHER HEIGHTS PHASE 2NB-3 BOOK 604 PAGE 39 MCR

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) RESIDENTIAL

A5. Latitude/Longitude: Lat. 33-41'12.3 Long. 112-13'22.7 Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1B

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s) _____ sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____
- c) Total net area of flood openings in A8.b _____ sq in
- d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:
- a) Square footage of attached garage 500 sq ft
- b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade 0
- c) Total net area of flood openings in A9.b 0 sq in
- d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
PEORIA 040050	MARICOPA	AZ

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
1190	H	9/30/2005	9/30/2005	AE	BFE=1287.05

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) LOMR EFF DATE 10/26/2006

B11. Indicate elevation datum used for BFE in Item B9: ☒ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) _____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date _____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.
Benchmark Utilized 47546-2MA Vertical Datum NGVD29
Conversion/Comments NGVD29=1290.59, CONVERTED TO NGVD29 DATUM USING VERTCON

			Check the measurement used.
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor)	1290.52	☒ feet ☐ meters (Puerto Rico only)
b)	Top of the next higher floor	_____	☐ feet ☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (V Zones only)	_____	☐ feet ☐ meters (Puerto Rico only)
d)	Attached garage (top of slab)	1290.04	☒ feet ☐ meters (Puerto Rico only)
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	1290.17	☒ feet ☐ meters (Puerto Rico only)
f)	Lowest adjacent (finished) grade next to building (LAG)	1289.76	☒ feet ☐ meters (Puerto Rico only)
g)	Highest adjacent (finished) grade next to building (HAG)	1289.93	☒ feet ☐ meters (Puerto Rico only)
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	_____	☐ feet ☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

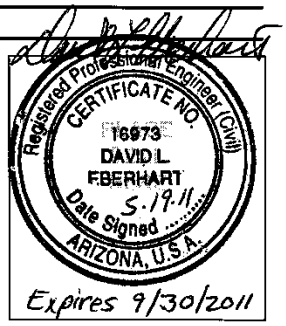
☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No

Certifier's Name DAVID L. EBERHART License Number 16973

Title PRESIDENT Company Name THUNDERBIRD CONSULTING GROUP, INC.

Address 6801 WEST ASTER DRIVE City PEORIA State AZ ZIP Code 85381

Signature David L. Eberhart Date 5-19-11 Telephone 623-412-0050



Expires 9/30/2011

FEMA Form 81-31, Mar 09 — See reverse side for continuation — Replaces all previous editions

Lot 166

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number
Company NAIC Number

A1. Building Owner's Name CRAIG KOTRYS

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
22345 NORTH 76TH DRIVE
City PEORIA State AZ ZIP Code 85383

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 200-07-685 LOT 166 FLETCHER HEIGHTS PHASE 2NB-3 BOOK 604 PAGE 39 MCR

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) RESIDENTIAL

A5. Latitude/Longitude: Lat. 33-41'11.9 Long. 112-13'22.7 Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1B

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s) _____ sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____
- c) Total net area of flood openings in A8.b _____ sq in
- d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:
- a) Square footage of attached garage 500 sq ft
- b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade 0
- c) Total net area of flood openings in A9.b 0 sq in
- d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
PEORIA 040050	MARICOPA	AZ

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
1190	H	9/30/2005	9/30/2005	AE	BFE=1286.94

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) LOMR EFF DATE 10/26/2006

B11. Indicate elevation datum used for BFE in Item B9: ☒ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) _____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date _____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.
Benchmark Utilized 47546-2MA Vertical Datum NGVD29
Conversion/Comments NGVD29=1290.59, CONVERTED TO NGVD29 DATUM USING VERTCON

			Check the measurement used.
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor)	1290.39	☒ feet ☐ meters (Puerto Rico only)
b)	Top of the next higher floor	_____	☐ feet ☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (V Zones only)	_____	☐ feet ☐ meters (Puerto Rico only)
d)	Attached garage (top of slab)	1289.86	☒ feet ☐ meters (Puerto Rico only)
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	1290.04	☒ feet ☐ meters (Puerto Rico only)
f)	Lowest adjacent (finished) grade next to building (LAG)	1289.71	☒ feet ☐ meters (Puerto Rico only)
g)	Highest adjacent (finished) grade next to building (HAG)	1289.88	☒ feet ☐ meters (Puerto Rico only)
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	_____	☐ feet ☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

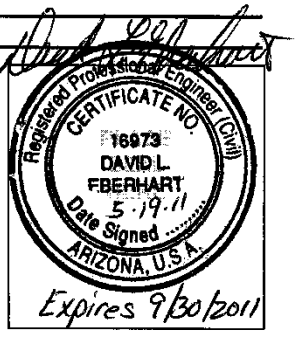
☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No

Certifier's Name DAVID L. EBERHART License Number 16973

Title PRESIDENT Company Name THUNDERBIRD CONSULTING GROUP, INC.

Address 6801 WEST ASTER DRIVE City PEORIA State AZ ZIP Code 85381

Signature David L. Eberhart Date 5-19-11 Telephone 623-412-0050



FEMA Form 81-31, Mar 09 — See reverse side for continuation — Replaces all previous editions

Lot 167

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number
Company NAIC Number

A1. Building Owner's Name CHRISTINA MAULFAIR

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
22329 NORTH 76TH DRIVE
City PEORIA State AZ ZIP Code 85383

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 200-07-686 LOT 167 FLETCHER HEIGHTS PHASE 2NB-3 BOOK 604 PAGE 39 MCR

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) RESIDENTIAL

A5. Latitude/Longitude: Lat. 33-41'11.4 Long. 112-13'22.6 Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1B

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s) _____ sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____
- c) Total net area of flood openings in A8.b _____ sq in
- d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:
- a) Square footage of attached garage 500 sq ft
- b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade 0
- c) Total net area of flood openings in A9.b 0 sq in
- d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
PEORIA 040050	MARICOPA	AZ

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
1190	H	9/30/2005	9/30/2005	AE	BFE=1286.82

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) LOMR EFF DATE 10/26/2006

B11. Indicate elevation datum used for BFE in Item B9: ☒ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) _____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date _____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.
Benchmark Utilized 47546-2MA Vertical Datum NGVD29
Conversion/Comments NGVD29=1290.59, CONVERTED TO NGVD29 DATUM USING VERTCON

			Check the measurement used.	
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor)	1290.05	☒ feet ☐ meters (Puerto Rico only)	
b)	Top of the next higher floor	_____	☐ feet	☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (V Zones only)	_____	☐ feet	☐ meters (Puerto Rico only)
d)	Attached garage (top of slab)	1289.57	☒ feet ☐ meters (Puerto Rico only)	
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	1289.63	☒ feet ☐ meters (Puerto Rico only)	
f)	Lowest adjacent (finished) grade next to building (LAG)	1289.43	☒ feet ☐ meters (Puerto Rico only)	
g)	Highest adjacent (finished) grade next to building (HAG)	1289.46	☒ feet ☐ meters (Puerto Rico only)	
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	_____	☐ feet	☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No

Certifier's Name DAVID L. EBERHART License Number 16973

Title PRESIDENT Company Name THUNDERBIRD CONSULTING GROUP, INC.

Address 6801 WEST ASTER DRIVE City PEORIA State AZ ZIP Code 85381

Signature David L. Eberhart Date 5-19-11 Telephone 623-412-0050

Registered Professional Engineer (Civil) CERTIFICATE NO. 16973 DAVID L. EBERHART Date Signed 5-19-11 ARIZONA, U.S.A.
Expires 9/30/2011

FEMA Form 81-31, Mar 09 See reverse side for continuation Replaces all previous editions

Lot 168

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number
Company NAIC Number

A1. Building Owner's Name MOLLY LEYVA

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
22313 NORTH 76TH DRIVE
City PEORIA State AZ ZIP Code 85383

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 200-07-687 LOT 168 FLETCHER HEIGHTS PHASE 2NB-3 BOOK 604 PAGE 39 MCR

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) RESIDENTIAL

A5. Latitude/Longitude: Lat. 33-41'10.8 Long. 112-13'22.6 Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1B

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s) _____ sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____
- c) Total net area of flood openings in A8.b _____ sq in
- d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:
- a) Square footage of attached garage 500 sq ft
- b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade 0
- c) Total net area of flood openings in A9.b 0 sq in
- d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
PEORIA 040050	MARICOPA	AZ

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
1190	H	9/30/2005	9/30/2005	AE	BFE=1286.71

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) LOMR EFF DATE 10/26/2006

B11. Indicate elevation datum used for BFE in Item B9: ☒ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) _____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date _____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.
Benchmark Utilized 47546-2MA Vertical Datum NGVD29
Conversion/Comments NGVD29=1290.59, CONVERTED TO NGVD29 DATUM USING VERTCON

		Check the measurement used.	
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor) 1289.83	☒ feet ☐ meters (Puerto Rico only)	
b)	Top of the next higher floor _____	☐ feet	☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (V Zones only) _____	☐ feet	☐ meters (Puerto Rico only)
d)	Attached garage (top of slab) 1289.40	☒ feet ☐ meters (Puerto Rico only)	
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments) 1289.34	☒ feet ☐ meters (Puerto Rico only)	
f)	Lowest adjacent (finished) grade next to building (LAG) 1288.98	☒ feet ☐ meters (Puerto Rico only)	
g)	Highest adjacent (finished) grade next to building (HAG) 1289.19	☒ feet ☐ meters (Puerto Rico only)	
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support _____	☐ feet	☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No

Certifier's Name DAVID L. EBERHART License Number 16973

Title PRESIDENT Company Name THUNDERBIRD CONSULTING GROUP, INC.

Address 6801 WEST ASTER DRIVE City PEORIA State AZ ZIP Code 85381

Signature David L. Eberhart Date 5-19-11 Telephone 623-412-0050

Registered Professional Engineer (Civil) CERTIFICATE NO. 16973 DAVID L. EBERHART Date Signed 5-19-11 ARIZONA, U.S.A.

Expires 9/30/2011

FEMA Form 81-31, Mar 09 — See reverse side for continuation — Replaces all previous editions

Lot 224

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number
Company NAIC Number

A1. Building Owner's Name BGSS INVESTMENTS LLC

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
22297 NORTH 76TH DRIVE
City PEORIA State AZ ZIP Code 85383

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 200-07-688 LOT 224 FLETCHER HEIGHTS PHASE 2NB-3 BOOK 604 PAGE 39 MCR

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) RESIDENTIAL

A5. Latitude/Longitude: Lat. 33-41'10.2 Long. 112-13'22.7 Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1B

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s) ____ sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade ____
- c) Total net area of flood openings in A8.b ____ sq in
- d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:
- a) Square footage of attached garage 500 sq ft
- b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade 0
- c) Total net area of flood openings in A9.b 0 sq in
- d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
PEORIA 040050	MARICOPA	AZ

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
1190	H	9/30/2005	9/30/2005	AE	BFE=1286.57

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) LOMR EFF DATE 10/26/2006

B11. Indicate elevation datum used for BFE in Item B9: ☒ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) ____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date ____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.

Benchmark Utilized 47546-2MA Vertical Datum NGVD29

Conversion/Comments NGVD29=1290.59, CONVERTED TO NGVD29 DATUM USING VERTCON

			Check the measurement used.
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor)	1289.65	☒ feet ☐ meters (Puerto Rico only)
b)	Top of the next higher floor	____.____	☐ feet ☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (V Zones only)	____.____	☐ feet ☐ meters (Puerto Rico only)
d)	Attached garage (top of slab)	1289.14	☒ feet ☐ meters (Puerto Rico only)
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	1289.31	☒ feet ☐ meters (Puerto Rico only)
f)	Lowest adjacent (finished) grade next to building (LAG)	1289.02	☒ feet ☐ meters (Puerto Rico only)
g)	Highest adjacent (finished) grade next to building (HAG)	1289.02	☒ feet ☐ meters (Puerto Rico only)
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	____.____	☐ feet ☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

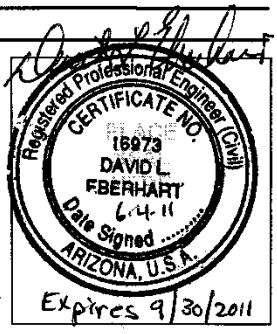
☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No

Certifier's Name DAVID L. EBERHART License Number 16973

Title PRESIDENT Company Name THUNDERBIRD CONSULTING GROUP, INC.

Address 6801 WEST ASTER DRIVE City PEORIA State AZ ZIP Code 85381

Signature David L. Eberhart Date 6-4-11 Telephone 623-412-0050



FEMA Form 81-31, Mar 09 — See reverse side for continuation — Replaces all previous editions

Lot 225

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number
Company NAIC Number

A1. Building Owner's Name STEPHANIE COMBS

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
22289 NORTH 76TH DRIVE
City PEORIA State AZ ZIP Code 85383

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 200-07-689 LOT 225 FLETCHER HEIGHTS PHASE 2NB-3 BOOK 604 PAGE 39 MCR

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) RESIDENTIAL

A5. Latitude/Longitude: Lat. 33-41'09.7 Long. 112-13'22.7 Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1B

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s) _____ sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____
- c) Total net area of flood openings in A8.b _____ sq in
- d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:
- a) Square footage of attached garage 500 sq ft
- b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade 0
- c) Total net area of flood openings in A9.b 0 sq in
- d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
PEORIA 040050	MARICOPA	AZ

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
1190	H	9/30/2005	9/30/2005	AE	BFE=1286.46

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) LOMR EFF DATE 10/26/2006

B11. Indicate elevation datum used for BFE in Item B9: ☒ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) _____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date _____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.
Benchmark Utilized 47546-2MA Vertical Datum NGVD29
Conversion/Comments NGVD29=1290.59, CONVERTED TO NGVD29 DATUM USING VERTCON

			Check the measurement used.
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor)	1289.73	☒ feet ☐ meters (Puerto Rico only)
b)	Top of the next higher floor	_____	☐ feet ☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (V Zones only)	_____	☐ feet ☐ meters (Puerto Rico only)
d)	Attached garage (top of slab)	1289.25	☒ feet ☐ meters (Puerto Rico only)
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	1289.58	☒ feet ☐ meters (Puerto Rico only)
f)	Lowest adjacent (finished) grade next to building (LAG)	1288.89	☒ feet ☐ meters (Puerto Rico only)
g)	Highest adjacent (finished) grade next to building (HAG)	1289.09	☒ feet ☐ meters (Puerto Rico only)
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	_____	☐ feet ☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No

Certifier's Name DAVID L. EBERHART License Number 16973

Title PRESIDENT Company Name THUNDERBIRD CONSULTING GROUP, INC.

Address 6801 WEST ASTER DRIVE City PEORIA State AZ ZIP Code 85381

Signature David L. Eberhart Date 6-4-11 Telephone 623-412-0050

Registered Professional Engineer (Civil) CERTIFICATE NO. 16973 DAVID L. EBERHART Date Signed 6-4-11 ARIZONA, U.S.A.
Expires 9/30/2011

FEMA Form 81-31, Mar 09 — See reverse side for continuation — Replaces all previous editions

Lot 226

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number
Company NAIC Number

A1. Building Owner's Name FREDIA R. SALDANO

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
22281 NORTH 76TH DRIVE
City PEORIA State AZ ZIP Code 85383

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 200-07-690 LOT 226 FLETCHER HEIGHTS PHASE 2NB-3 BOOK 604 PAGE 39 MCR

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) RESIDENTIAL

A5. Latitude/Longitude: Lat. 33-41'09.3 Long. 112-13'22.7 Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1B

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s) _____ sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____
- c) Total net area of flood openings in A8.b _____ sq in
- d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:
- a) Square footage of attached garage 500 sq ft
- b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade 0
- c) Total net area of flood openings in A9.b 0 sq in
- d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
PEORIA 040050	MARICOPA	AZ

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
1190	H	9/30/2005	9/30/2005	AE	BFE=1286.34

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) LOMR EFF DATE 10/26/2006

B11. Indicate elevation datum used for BFE in Item B9: ☒ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) _____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date _____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

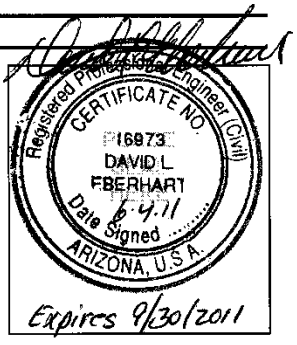
C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.
Benchmark Utilized 47546-2MA Vertical Datum NGVD29
Conversion/Comments NGVD29=1290.59, CONVERTED TO NGVD29 DATUM USING VERTCON

		Check the measurement used.
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	1289.96	☒ feet ☐ meters (Puerto Rico only)
b) Top of the next higher floor	_____	☐ feet ☐ meters (Puerto Rico only)
c) Bottom of the lowest horizontal structural member (V Zones only)	_____	☐ feet ☐ meters (Puerto Rico only)
d) Attached garage (top of slab)	1289.45	☒ feet ☐ meters (Puerto Rico only)
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	1289.41	☒ feet ☐ meters (Puerto Rico only)
f) Lowest adjacent (finished) grade next to building (LAG)	1288.98	☒ feet ☐ meters (Puerto Rico only)
g) Highest adjacent (finished) grade next to building (HAG)	1289.09	☒ feet ☐ meters (Puerto Rico only)
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	_____	☐ feet ☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No



Certifier's Name DAVID L. EBERHART License Number 16973

Title PRESIDENT Company Name THUNDERBIRD CONSULTING GROUP, INC.

Address 6801 WEST ASTER DRIVE City PEORIA State AZ ZIP Code 85381

Signature David L. Eberhart Date 6-4-11 Telephone 623-412-0050

Expires 9/30/2011

FEMA Form 81-31, Mar 09 See reverse side for continuation Replaces all previous editions

Lot 227

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number
Company NAIC Number

A1. Building Owner's Name DAVID AND JANE DREILING

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
22273 NORTH 76TH DRIVE
City PEORIA State AZ ZIP Code 85383

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 200-07-691 LOT 227 FLETCHER HEIGHTS PHASE 2NB-3 BOOK 604 PAGE 39 MCR

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) RESIDENTIAL

A5. Latitude/Longitude: Lat. 33-41'08.8 Long. 112-13'22.7 Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1B

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s) _____ sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____
- c) Total net area of flood openings in A8.b _____ sq in
- d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:
- a) Square footage of attached garage 500 sq ft
- b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade 0
- c) Total net area of flood openings in A9.b 0 sq in
- d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
PEORIA 040050	MARICOPA	AZ

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
1190	H	9/30/2005	9/30/2005	AE	BFE=1286.23

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) LOMR EFF DATE 10/26/2006

B11. Indicate elevation datum used for BFE in Item B9: ☒ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) _____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date _____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.
Benchmark Utilized 47546-2MA Vertical Datum NGVD29
Conversion/Comments NGVD29=1290.59, CONVERTED TO NGVD29 DATUM USING VERTCON

		Check the measurement used.
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor) 1289.82	☒ feet ☐ meters (Puerto Rico only)
b)	Top of the next higher floor _____	☐ feet ☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (V Zones only) _____	☐ feet ☐ meters (Puerto Rico only)
d)	Attached garage (top of slab) 1289.33	☒ feet ☐ meters (Puerto Rico only)
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments) 1289.47	☒ feet ☐ meters (Puerto Rico only)
f)	Lowest adjacent (finished) grade next to building (LAG) 1288.96	☒ feet ☐ meters (Puerto Rico only)
g)	Highest adjacent (finished) grade next to building (HAG) 1289.20	☒ feet ☐ meters (Puerto Rico only)
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support _____	☐ feet ☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No

Certifier's Name DAVID L. EBERHART License Number 16973

Title PRESIDENT Company Name THUNDERBIRD CONSULTING GROUP, INC.

Address 6801 WEST ASTER DRIVE City PEORIA State AZ ZIP Code 85381

Signature David L. Eberhart Date 6-4-11 Telephone 623-412-0050

Registered Professional Engineer (Civil) CERTIFICATE NO. 16973 DAVID L. EBERHART Date Signed 6-4-11 ARIZONA, U.S.A.
Expires 9/30/2011

FEMA Form 81-31, Mar 09 — See reverse side for continuation — Replaces all previous editions

Lot 228

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number:
Company NAIC Number:

A1. Building Owner's Name STEPHANIE ROGERS

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
22265 NORTH 76TH DRIVE
City PEORIA State AZ ZIP Code 85383

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 200-07-692 LOT 228 FLETCHER HEIGHTS PHASE 2NB-3 BOOK 604 PAGE 39 MCR

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) RESIDENTIAL

A5. Latitude/Longitude: Lat. 33-41'08.2 Long. 112-13'22.8 Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1B

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s) _____ sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____
- c) Total net area of flood openings in A8.b _____ sq in
- d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:
- a) Square footage of attached garage 500 sq ft
- b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade 0
- c) Total net area of flood openings in A9.b 0 sq in
- d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
PEORIA 040050	MARICOPA	AZ

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
1190	H	9/30/2005	9/30/2005	AE	BFE=1286.11

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) LOMR EFF DATE 10/26/2006

B11. Indicate elevation datum used for BFE in Item B9: ☒ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) _____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date _____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.
Benchmark Utilized 47546-2MA Vertical Datum NGVD29
Conversion/Comments NGVD29=1290.59, CONVERTED TO NGVD29 DATUM USING VERTCON

			Check the measurement used.
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor)	1289.46	☒ feet ☐ meters (Puerto Rico only)
b)	Top of the next higher floor	_____	☐ feet ☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (V Zones only)	_____	☐ feet ☐ meters (Puerto Rico only)
d)	Attached garage (top of slab)	1288.97	☒ feet ☐ meters (Puerto Rico only)
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	1289.06	☒ feet ☐ meters (Puerto Rico only)
f)	Lowest adjacent (finished) grade next to building (LAG)	1288.84	☒ feet ☐ meters (Puerto Rico only)
g)	Highest adjacent (finished) grade next to building (HAG)	1289.00	☒ feet ☐ meters (Puerto Rico only)
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	_____	☐ feet ☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No

Certifier's Name DAVID L. EBERHART License Number 16973

Title PRESIDENT Company Name THUNDERBIRD CONSULTING GROUP, INC.

Address 6801 WEST ASTER DRIVE City PEORIA State AZ ZIP Code 85381

Signature David L. Eberhart Date 6.4.11 Telephone 623-412-0050

Registered Professional Engineer (Civil) CERTIFICATE NO. 16973 DAVID L. EBERHART Date Signed 6.4.11 ARIZONA, U.S.A.

Expires 9/30/2011

FEMA Form 81-31, Mar 09 — See reverse side for continuation — Replaces all previous editions

Lot 229

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number
Company NAIC Number

A1. Building Owner's Name KEVIN AND MARY MAHONEY

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
22257 NORTH 76TH DRIVE
City PEORIA State AZ ZIP Code 85383

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 200-07-693 LOT 229 FLETCHER HEIGHTS PHASE 2NB-3 BOOK 604 PAGE 39 MCR

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) RESIDENTIAL

A5. Latitude/Longitude: Lat. 33-41'07.8 Long. 112-13'22.9 Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1B

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s) ____ sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade ____
- c) Total net area of flood openings in A8.b ____ sq in
- d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:
- a) Square footage of attached garage 500 sq ft
- b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade 0
- c) Total net area of flood openings in A9.b 0 sq in
- d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
PEORIA 040050	MARICOPA	AZ

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
1190	H	9/30/2005	9/30/2005	AE	BFE=1285.99

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) LOMR EFF DATE 10/26/2006

B11. Indicate elevation datum used for BFE in Item B9: ☒ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) ____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date ____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.

Benchmark Utilized 47546-2MA Vertical Datum NGVD29

Conversion/Comments NGVD29=1290.59, CONVERTED TO NGVD29 DATUM USING VERTCON

			Check the measurement used.
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor)	1289.34	☒ feet ☐ meters (Puerto Rico only)
b)	Top of the next higher floor	____.____	☐ feet ☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (V Zones only)	____.____	☐ feet ☐ meters (Puerto Rico only)
d)	Attached garage (top of slab)	1288.81	☒ feet ☐ meters (Puerto Rico only)
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	1288.91	☒ feet ☐ meters (Puerto Rico only)
f)	Lowest adjacent (finished) grade next to building (LAG)	1288.39	☒ feet ☐ meters (Puerto Rico only)
g)	Highest adjacent (finished) grade next to building (HAG)	1288.80	☒ feet ☐ meters (Puerto Rico only)
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	____.____	☐ feet ☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No

Registered Professional Engineer (Civil) CERTIFICATE NO. PLACE 16973 DAVID L. EBERHART Date Signed 6.4.11 ARIZONA, U.S.A. Expires 9/30/2011

Certifier's Name DAVID L. EBERHART License Number 16973

Title PRESIDENT Company Name THUNDERBIRD CONSULTING GROUP, INC.

Address 6801 WEST ASTER DRIVE City PEORIA State AZ ZIP Code 85381

Signature David L. Eberhart Date 6.4.11 Telephone 623-412-0050

FEMA Form 81-31, Mar 09 See reverse side for continuation. Replaces all previous editions

Lot 230

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number:
Company NAIC Number:

A1. Building Owner's Name DOROTHY WHITE

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
22249 NORTH 76TH DRIVE
City PEORIA State AZ ZIP Code 85383

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 200-07-694 LOT 230 FLETCHER HEIGHTS PHASE 2NB-3 BOOK 604 PAGE 39 MCR

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) RESIDENTIAL

A5. Latitude/Longitude: Lat. 33-41'07.3 Long. 112-13'22.8 Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1B

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s) _____ sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____
- c) Total net area of flood openings in A8.b _____ sq in
- d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:
- a) Square footage of attached garage 500 sq ft
- b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade 0
- c) Total net area of flood openings in A9.b 0 sq in
- d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
PEORIA 040050	MARICOPA	AZ

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
1190	H	9/30/2005	9/30/2005	AE	BFE=1285.64

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) LOMR EFF DATE 10/26/2006

B11. Indicate elevation datum used for BFE in Item B9: ☒ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) _____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date _____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.
Benchmark Utilized 47546-2MA Vertical Datum NGVD29
Conversion/Comments NGVD29=1290.59, CONVERTED TO NGVD29 DATUM USING VERTCON

			Check the measurement used.
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor)	1289.11	☒ feet ☐ meters (Puerto Rico only)
b)	Top of the next higher floor	_____	☐ feet ☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (V Zones only)	_____	☐ feet ☐ meters (Puerto Rico only)
d)	Attached garage (top of slab)	1288.57	☒ feet ☐ meters (Puerto Rico only)
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	1288.44	☒ feet ☐ meters (Puerto Rico only)
f)	Lowest adjacent (finished) grade next to building (LAG)	1287.88	☒ feet ☐ meters (Puerto Rico only)
g)	Highest adjacent (finished) grade next to building (HAG)	1288.13	☒ feet ☐ meters (Puerto Rico only)
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	_____	☐ feet ☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No

Certifier's Name DAVID L. EBERHART License Number 16973

Title PRESIDENT Company Name THUNDERBIRD CONSULTING GROUP, INC.

Address 6801 WEST ASTER DRIVE City PEORIA State AZ ZIP Code 85381

Signature David L. Eberhart Date 6-4-11 Telephone 623-412-0050

Registered Professional Engineer (Civil) CERTIFICATE NO. 16973 DAVID L. EBERHART Date Signed 6-4-11 ARIZONA, U.S.A.
Expires 9/30/2011

FEMA Form 81-31, Mar 09 See reverse side for continuation. Replaces all previous editions

Lot 231

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number
Company NAIC Number

A1. Building Owner's Name JENNIFER WATKINS

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
22241 NORTH 76TH DRIVE
City PEORIA State AZ ZIP Code 85383

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 200-07-695 LOT 231 FLETCHER HEIGHTS PHASE 2NB-3 BOOK 604 PAGE 39 MCR

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) RESIDENTIAL

A5. Latitude/Longitude: Lat. 33-41'06.8 Long. 112-13'23.0 Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1B

A8. For a building with a crawlspace or enclosure(s):
a) Square footage of crawlspace or enclosure(s) _____ sq ft
b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____
c) Total net area of flood openings in A8.b _____ sq in
d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:
a) Square footage of attached garage 500 sq ft
b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade 0
c) Total net area of flood openings in A9.b 0 sq in
d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
PEORIA 040050	MARICOPA	AZ

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
1190	H	9/30/2005	9/30/2005	AE	BFE=1285.29

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) LOMR EFF DATE 10/26/2006

B11. Indicate elevation datum used for BFE in Item B9: ☒ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) _____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date _____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.
Benchmark Utilized 47546-2MA Vertical Datum NGVD29
Conversion/Comments NGVD29=1290.59, CONVERTED TO NGVD29 DATUM USING VERTCON

			Check the measurement used.
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor)	1288.74	☒ feet ☐ meters (Puerto Rico only)
b)	Top of the next higher floor	_____	☐ feet ☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (V Zones only)	_____	☐ feet ☐ meters (Puerto Rico only)
d)	Attached garage (top of slab)	1288.30	☒ feet ☐ meters (Puerto Rico only)
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	1288.27	☒ feet ☐ meters (Puerto Rico only)
f)	Lowest adjacent (finished) grade next to building (LAG)	1288.04	☒ feet ☐ meters (Puerto Rico only)
g)	Highest adjacent (finished) grade next to building (HAG)	1288.16	☒ feet ☐ meters (Puerto Rico only)
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	_____	☐ feet ☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No

Registered Professional Engineer (Civil) PLACE CERTIFICATE NO. 16973 DAVID L. EBERHART Date Signed 6-4-11 ARIZONA, U.S.A.

Certifier's Name DAVID L. EBERHART License Number 16973

Title PRESIDENT Company Name THUNDERBIRD CONSULTING GROUP, INC.

Address 6801 WEST ASTER DRIVE City PEORIA State AZ ZIP Code 85381

Signature David L. Eberhart Date 6-4-11 Telephone 623-412-0050

Expires 9/30/2011

FEMA Form 81-31, Mar 09 See reverse side for continuation. Replaces all previous editions

Lot 232

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number
Company NAIC Number

A1. Building Owner's Name LINDSAY GOMEZ

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
22233 NORTH 76TH DRIVE
City PEORIA State AZ ZIP Code 85383

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 200-07-696 LOT 232 FLETCHER HEIGHTS PHASE 2NB-3 BOOK 604 PAGE 39 MCR

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) RESIDENTIAL

A5. Latitude/Longitude: Lat. 33-41'06.3 Long. 112-13'23.1 Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1B

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s) _____ sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____
- c) Total net area of flood openings in A8.b _____ sq in
- d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:
- a) Square footage of attached garage 500 sq ft
- b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade 0
- c) Total net area of flood openings in A9.b 0 sq in
- d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
PEORIA 040050	MARICOPA	AZ

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
1190	H	9/30/2005	9/30/2005	AE	BFE=1284.94

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) LOMR EFF DATE 10/26/2006

B11. Indicate elevation datum used for BFE in Item B9: ☒ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) _____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date _____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.
Benchmark Utilized 47546-2MA Vertical Datum NGVD29
Conversion/Comments NGVD29=1290.59, CONVERTED TO NGVD29 DATUM USING VERTCON

			Check the measurement used.
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor)	1288.40	☒ feet ☐ meters (Puerto Rico only)
b)	Top of the next higher floor	_____	☐ feet ☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (V Zones only)	_____	☐ feet ☐ meters (Puerto Rico only)
d)	Attached garage (top of slab)	1287.93	☒ feet ☐ meters (Puerto Rico only)
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	1288.05	☒ feet ☐ meters (Puerto Rico only)
f)	Lowest adjacent (finished) grade next to building (LAG)	1287.38	☒ feet ☐ meters (Puerto Rico only)
g)	Highest adjacent (finished) grade next to building (HAG)	1287.95	☒ feet ☐ meters (Puerto Rico only)
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	_____	☐ feet ☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No

Certifier's Name DAVID L. EBERHART License Number 16973

Title PRESIDENT Company Name THUNDERBIRD CONSULTING GROUP, INC.

Address 6801 WEST ASTER DRIVE City PEORIA State AZ ZIP Code 85381

Signature David L. Eberhart Date 6-4-11 Telephone 623-412-0050

Registered Professional Engineer (Civil) CERTIFICATE NO. 16973 DAVID L EBERHART Date Signed 6-4-11 ARIZONA, U.S.A.

Expires 9/30/2011

FEMA Form 81-31, Mar 09 See reverse side for continuation. Replaces all previous editions

Lot 233

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number
Company NAIC Number

A1. Building Owner's Name RANDALL AND CYNTHIA HOPPE

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
22225 NORTH 76TH DRIVE
City PEORIA State AZ ZIP Code 85383

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 200-07-697 LOT 233 FLETCHER HEIGHTS PHASE 2NB-3 BOOK 604 PAGE 39 MCR

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) RESIDENTIAL

A5. Latitude/Longitude: Lat. 33-41'05.8 Long. 112-13'23.1 Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1B

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s) ____ sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade ____
- c) Total net area of flood openings in A8.b ____ sq in
- d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:
- a) Square footage of attached garage 500 sq ft
- b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade 0
- c) Total net area of flood openings in A9.b 0 sq in
- d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
PEORIA 040050	MARICOPA	AZ

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
1190	H	9/30/2005	9/30/2005	AE	BFE=1284.62

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) LOMR EFF DATE 10/26/2006

B11. Indicate elevation datum used for BFE in Item B9: ☒ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) ____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date ____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.
Benchmark Utilized 47546-2MA Vertical Datum NGVD29
Conversion/Comments NGVD29=1290.59, CONVERTED TO NGVD29 DATUM USING VERTCON

			Check the measurement used.	
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor)	1288.21	☒ feet	☐ meters (Puerto Rico only)
b)	Top of the next higher floor	____.____	☐ feet	☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (V Zones only)	____.____	☐ feet	☐ meters (Puerto Rico only)
d)	Attached garage (top of slab)	1287.70	☒ feet	☐ meters (Puerto Rico only)
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	1287.91	☒ feet	☐ meters (Puerto Rico only)
f)	Lowest adjacent (finished) grade next to building (LAG)	1287.47	☒ feet	☐ meters (Puerto Rico only)
g)	Highest adjacent (finished) grade next to building (HAG)	1287.62	☒ feet	☐ meters (Puerto Rico only)
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	____.____	☐ feet	☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.*

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No

Certifier's Name DAVID L. EBERHART License Number 16973

Title PRESIDENT Company Name THUNDERBIRD CONSULTING GROUP, INC.

Address 6801 WEST ASTER DRIVE City PEORIA State AZ ZIP Code 85381

Signature David L. Eberhart Date 6-4-11 Telephone 623-412-0050

Registered Professional Engineer (Civil) CERTIFICATE NO. 16973 DAVID L. EBERHART Date Signed 6-4-11 ARIZONA, U.S.A.

Expires 9/30/2011

FEMA Form 81-31, Mar 09 See reverse side for continuation. Replaces all previous editions

APPENDIX E

Recorded Documents

RE-RECORDED TO REFLECT AMENDED LEGAL DESCRIPTION DATED 10-25-83

RECORDED OF MARICOPA COUNTY
BILL HENRY, COUNTY RECORDER
FEE N/C PGS 4

When recorded, return to

Flood Control District of Maricopa County
3335 West Durango Street
Phoenix, Arizona 85009

EASEMENT NO.

84 063659
COR Esmt

EASEMENT AND AGREEMENT FOR FLOOD CONTROL PURPOSES

Recorded in official records of Maricopa County, Arizona
DATE FEB 15 '84 -2 00 FEE N-C PGS 4
BILL HENRY, COUNTY RECORDER

Project New River Dam
Item 14
Assessor Parcel 201-20-3

Daniel A. Crippen and Erma J. Crippen, his wife, as joint tenants with right of survivorship, Grantor(s), FOR AND IN CONSIDERATION of the sum $111,820 and other valuable considerations, the receipt and sufficiency of which are hereby acknowledged, do(es) hereby grant and convey to the FLOOD CONTROL DISTRICT OF MARICOPA COUNTY, a municipal corporation and political subdivision of the State of Arizona, its successors and assigns, Grantee,

THE perpetual and assignable right, power, privilege and easement occasionally to overflow, flood and submerge (and to maintain mosquito control) in connection with the operation and maintainance of a flood control project, the land described as follows:

See attached Exhibit A attached hereto

(AMENDED LEGAL DESCRIPTION DATED 10-25-83)

TOGETHER with all right, title and interest in and to the structures and improvements now situated on the land, except None

PROVIDED that no structures for human habitation shall be constructed or maintained on the land; and provided further that no other structures shall be constructed or maintained on the land except as may be approved in writing by the Grantee, and that no excavation shall be conducted and no landfill placed on the land without such approval as to the location and method of excavation and/or placement of landfill;

SAID INTERESTS ARE GRANTED SUBJECT, however, to existing esements for public roads and highways, public utilities, railroads and pipelines, and the following: None;

RESERVING, however, to the Grantor(s), their heirs, and assigns, such rights and privileges as may be used and enjoyed without interfering with or abridging the rights and easement hereby granted; provided that any use of the land by the Grantor(s), their heirs, and assigns shall be subject to Federal, State and local laws and ordinances with respect to pollution and land use.

TO HAVE AND TO HOLD the said rights and easement unto the Grantee, its successors and assigns, FOREVER.

83-379711

84 063659

AND THE SAID GRANTOR(S) COVENANT to and with the said Grantee its successors and assigns that they are lawfully seized and possessed in fee of the premises in which the said interests are granted; that they have a good and lawful right to sell and convey the said interests; that the said premises are free and clear of all encumbrances except as above noted; and that they will, and their heirs, executors, and administrators shall, warrant and forever defend the title to the said interests against the lawful claims and demands of all persons whomsoever.

Dated this 8 day of September, 1983

Daniel A. Crippen
Grantor Daniel A. Crippen

Erma J. Crippen
Grantor Erma J. Crippen

Grantor

Grantor

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

Subscribed and sworn to before me this 8 date of September, 1983

My commission expires My Commission Expires 1984

Emily Marek
(Notary Public)

RECOMMEND FOR APPROVAL

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

Stanley L. Smith DEPUTY
for D. E. Sagramoso, P.E.
Chief Engineer and General Manager

ACCEPTED AND APPROVED

BOARD OF DIRECTORS OF FLOOD CONTROL
DISTRICT OF MARICOPA COUNTY

Hawley Atkinson
(Chairman of the Board)

John E. Burke, Chief
Land Management Division

ATTEST:

Cherie Pennington
(Clerk of the Board)

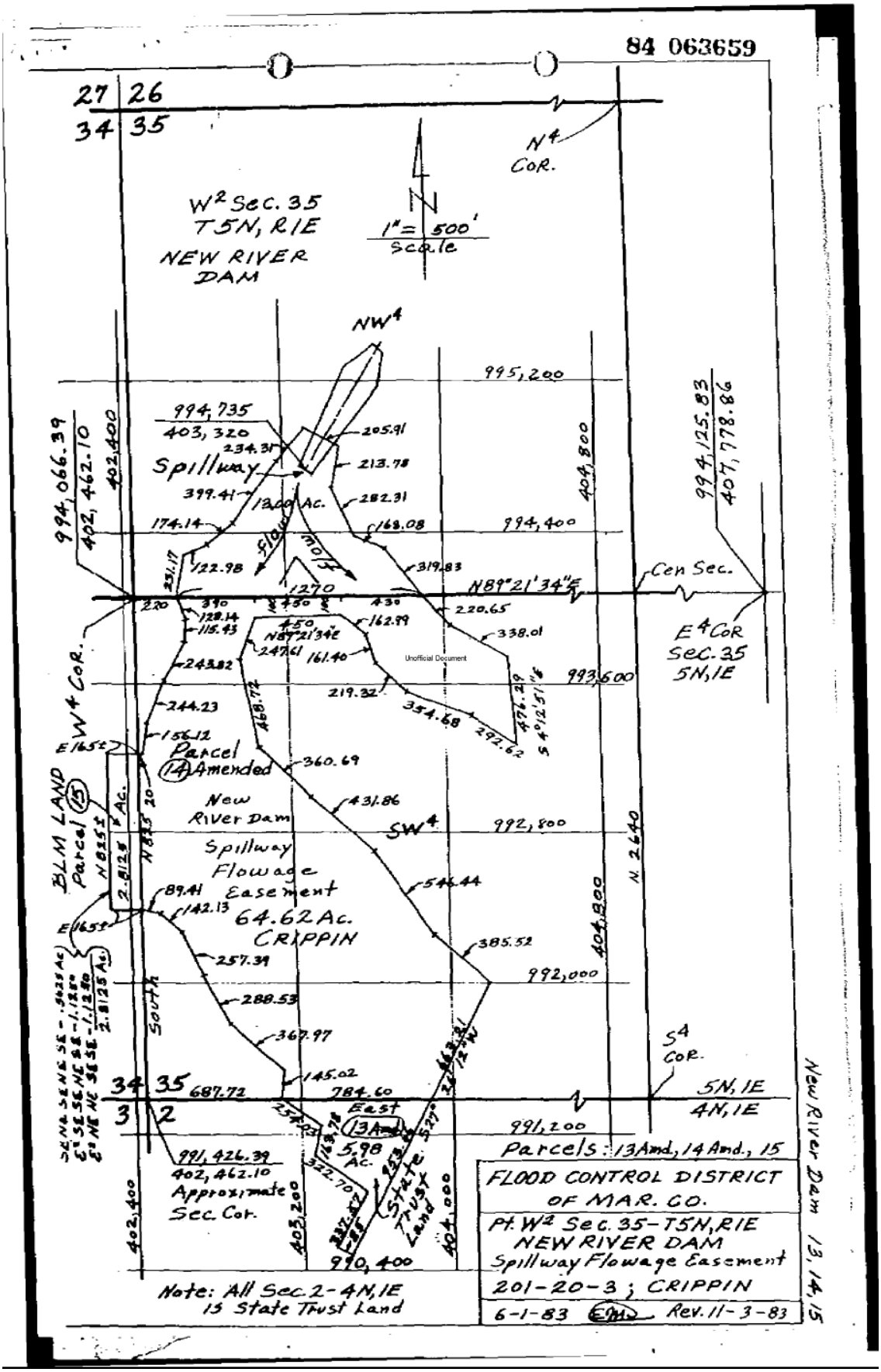
Date: SEP 12 1983

84 063659

New River Dam
Spillway Flowage Easement
201-20-3; Crippin
Parcel 14 Amended

That portion of the Southwest quarter (SW^4) of Section 35-T5N, R1E, G&SRB&M, Mar. Co., Az, described as follows: Beginning at the $West^4$ corner of said section; thence along the East-West mid section line North 89°21'34" East 220' to the true point of beginning; thence continuing N89°21'34"E 1270'; thence S40°23'42"E 220.65'; S60°46'51"E 338.01'; S04°12'51"E 476.29'; N56°51'11"W 292.62'; N68°29'55"W 354.68'; N46°50'51"W 219.32'; N16°11'21"W 161.40'; N48°22'57"W 162.99'; to a point S00°38'26"E 100' from said East-West mid section line, thence parallel to said line S89°21'34"W 450'; thence S19°37'45"W 247.61'; S11°04'13"E 468.72'; S43°52'36"E 360.69'; S47°48'56"E 431.86';S34°33'45"E 546.44'; S46°34'36"E 385.52'; S27°26'12"W 663.21' to the South line of said section; thence West along said line 784.60'; thence N08°00'00"E 145.02'; N47°12'09"W 367.97'; N27°53'50"W 288.53'; N24°04'32"W; 257.39'; N50°42'38"W 142.13'; N79°26'16"W 89.41' to the West line of said section; thence along said line North 825'; thence East 20'; thence N10°17'40"E 156.12'; N22°53'26"E 244.23'; N28°08'30"E 243.82'; N04°58'11"E 115.43'; thence N21°57'24"W 128.14' to the true point of beginning; containing 2,814,671 square feet or 64.62 acres more or less.

10-25-83; Amended
6/10/83: Exhibit A


84 063659
27 26
34 35
N4 COR.
W2 Sec. 35 T5N, R1E NEW RIVER DAM
1" = 500' Scale
NW4
995,200
994,735
403,320
234.31
205.91
213.78
Spillway
399.41
13.00 Ac.
282.31
174.14
168.08
994,400
994,066.39
402,462.10
402,400
404,800
994,125.83
404,778.86
231.17
122.98
319.83
1270
N89°21'34"E
Cen Sec.
220
390
430
220.65
128.14
115.43
450
162.99
338.01
N89°21'34"E
247.61
161.40
E4 COR Sec. 35 5N, 1E
243.82
993,600
219.32
354.68
292.62
S 4°12'51"W
474.29
244.23
468.72
W4 COR.
E 165±
156.12
Parcel (14) Amended
360.69
New River Dam
431.86
BLM LAND Parcel (15)
N 825±
2.8128 Ac.
SW4
992,800
Spillway Flowage Easement
64.62 Ac.
CRIPPIN
89.41
142.13
546.44
E 165±
385.52
257.39
992,000
404,800
N. 2640
288.53
South
367.97
145.02
S4 COR.
34 35
687.72
784.60
East
5N, 1E
4N, 1E
3 2
(13 Amd)
5.98 Ac.
991,200
Parcels: 13 Amd., 14 Amd., 15
991,426.39
402,462.10
Approximate Sec. Cor.
322.70
State Trust Land
402,400
403,200
404,000
990,400
FLOOD CONTROL DISTRICT OF MAR. CO.
Pt. W2 Sec. 35-T5N, R1E NEW RIVER DAM
Spillway Flowage Easement
201-20-3 ; CRIPPIN
6-1-83 EMW Rev. 11-3-83
Note: All Sec. 2-4N, 1E is State Trust Land
New River Dam 13, 14, 15

APPENDIX F

HAZUS-MH 2.1 City of Peoria Flood Response Plan HAZUS Project Results

HAZUS-MH 2.1 City of Peoria Flood Response Plan HAZUS Project

Estimating economic losses is essential to decision-making at all levels of government, providing a basis for developing mitigation plans and polices, emergency preparedness, and response and recovery planning. Hazards U.S. Multi-Hazard is a powerful risk assessment software program used for analyzing potential losses from earthquakes, hurricane winds, and floods. HAZUS-MH uses state-of-the-art Geographic Information Systems (GIS) software to map and display hazard data and the results of damage and economic loss estimated for building and infrastructure. It also estimates the impact of earthquakes, hurricane winds, and floods on populations. This software was developed by Federal Emergency Management Agency (FEMA) under contract with the National Institute of Building Sciences (NIBS).

Flood Model

The HAZUS-MH Flood Model allows planners and other practitioners to carry out a wide range of flood hazard analyses, including:

- Studies of specific return intervals of floods (10, 50, 100, 200, and 500-year return interval).
- Studies of discharge frequencies, including analysis of discharges from specific streams and the exposure to buildings and population from the resultant flooding.
- Studies of annualized losses from flooding.
- Quick Look assessments, which allows the user to quickly evaluate potential flooding from specific flood depths at specific locations.
- What if scenarios, allow users to evaluate the consequences of specific actions, such as the introduction of flow regulation devices, acquisition of flood-prone properties, and other mitigation measures.

The flood loss estimation methodology consists of two modules that carry out basic analytical processes: flood hazard analysis and flood loss estimation analysis. The flood hazard analysis module uses characteristics, such as frequency, discharge, and ground elevation to estimate flood depth, flood elevation, and flow velocity. The flood loss estimation module calculates physical damage and economic loss from the results of the hazard analysis.

Flood Model Results

Once a successful region has been created and scenarios within an area have been analyzed a model output will consist of:

- General Building Stock Damage Results – By Amount of Damage from occupancy, building type (sqft) and by count.
- By Dollar Losses – Full replacement value and depreciated replacement value, building, content, and inventory losses, cost of relocation, wage and income losses, rental income loss, direct employee output losses and employment loss (days).
- Essential Facilities – Building and content losses, functionality assessment, restoration time to 100% functionality.
- Lifeline Losses (for selected components) – Losses to structures and equipment, functionality assessment.

- Transportation Systems
- Utility Systems
- Agriculture Losses
- Vehicle Losses
- Debris
- Shelter Requirements
- Indirect Economic Losses – Income and employment impact with and without aid by market sector, Agriculture, mining, construction, manufacturing, transpiration, trade, services, government, and miscellaneous.

HAZUS-MH City of Peoria FRP Data Requirements

The City of Peoria Flood Response Plan project is in Maricopa County, Arizona. The region contains 36 census tracts; 04025001400, 04013071507, 04013071508, 04013071509, 04013071510, 04013071511, 04013071512, 04013071513, 04013071801, 04013071802, 04013071903, 04013071904, 04013071906, 04013071908, 04013071909, 04013071910, 04013071911, 04013092310, 04013092704, 04013092707, 04013092708, 04013092709, 04013030311, 04013030329, 04013030340, 04013030341, 04013030344, 04013030346, 04013030347, 04013030368, 4013030369, 4013030371, 4013030373, 04013030374, 04013030375 and 04013040509. It also contains 1972 census blocks. A complete list of these blocks can be found in the RegionBndry.MDB file which is included with this FRP.

The digital elevation model (DEM) that was used for this project was provided by the Flood Control District of Maricopa County (FCDMC) and United States Geological Surveys' (USGS) National Map Seamless Server, http://seamless.usgs.gov/index.php. The USGS map server provides free geospatial data that allows downloading of national base layers, as well as other geospatial data layers including places, structures, transportation, boundaries, hydrography, orthoimagery, land cover and elevation. The north most latitude, east most longitude, south most latitude and west most longitude were taken from the study region which defined the extent of the DEM that we needed for our project. For Maricopa County a 10 foot Countywide NAVD88 TIN file was used. A large part of the PFRP's North Zone is located in Yavapai County. Maricopa County doesn't have 10 foot elevation data for this area. The DEM used for Yavapai County was the National Elevation Data (NED) of 1 arc second (approximately 30 meters). Using ArcGIS, the USGS raster data was changed into TIN data. Then both these files where merged together using ArcGIS.

The Flood Information Tool (FIT), which is an ArcGIS extension, is used to calculate flood depth and elevation at particular locations along a watercourse. The software extension needs some user supplied flood hazard data to run the analysis. For a riverine study area the FIT requires three different types of input data which include:

1.) A digital elevation model (DEM) which describes the terrain elevations and establishes cell size of all output girds.
2.) Flood elevation lines which contain populated fields for flood elevations and discharges for one or more return periods
3.) Floodplain boundaries which define the centerline of flow and act as a guide for determining the floodplain width.

For the City of Peoria FRP three areas within the FRP where FIT models were created and ran were Vistancia Boulevard at Twin Buttes Wash, New River at Jomax Road and New River at Bell Road. The digital elevation models used in the FIT models are from the District's database and have a 10 foot resolution. The flood elevation lines were from the District's database. The xs_fema.shp file was used which shows all the FEMA cross sections. The FEMA NFIP flood profiles, summary of discharges, and floodway data were also used to get the flood elevations for a 100-year storm event. The floodplain boundaries that were used were also from the District's database. The femafloodplain.shp file was used which shows all of the FEMA floodplains. After getting the results for each individual FIT model, the results were input into the HAZUS-MH Flood Model for City of Peoria FRP.

HAZUS requires the user to input specific user data for a region. The DEM for the region is added to the project as the base topography. The results from all three of the FIT models are added as well as the three depth elevation grids created from the FIT analysis.

City of Peoria Flood Response Plan Region

The City of Peoria Flood Response Plan area was defined in HAZUS as one study region.

The stream network that was developed for the region was defined as any watercourse that had drainage of 0.25 square miles or more. The smallest stream network allowed by HAZUS is 0.25 square mile. The most detailed stream network was used in this region to make sure watercourses within the newly developed communities were identified. Once the stream network was defined the hydrologic analysis can be run and the floodplains can be delineated for areas up to 10 square miles.

Prior to running the final analysis on the scenarios, some of the inventory data was revised to make the default data more accurate. The Transportation Systems Highway Bridges Data was revised a couple of ways. The Average Daily Traffic counts from 2011 where provided by City of Peoria. These totals where updated and added to the traffic count column so the vehicle losses section of the final report would be more accurate. The latitude and longitude of several HAZUS Bridges were edited and 134 bridges were added. The bridges that were added are ID US00001-US00134. The information for these bridges was obtained by the City of Peoria and through analysis of several ArcGIS products. The Essential Facilities Inventory was updated using the HAZUS-MH Comprehensive Data Management System (CDMS). The Comprehensive Data Management System (CDMS) is a complimentary tool to Hazus Mulit-Hazard (Hazus-MH) that provides users with the capability to update and manage statewide datasets, which are currently used to support analysis in Hazus-MH. The Police Station, Fire Station, Care Facility and Schools information was edited for the City of Peoria FRP region.

Results for City of 100-yr Scenario

The flood loss estimates in this scenario are based on a region that included Maricopa County and Yavapai County. The geographical size of the region is 170 square miles and contains 1,972 census blocks. Of all the defined river reaches within the City of Peoria that had 0.25 miles square miles of drainage or more, 275 where analyzed. The 275 reaches that were chosen were the main stream reaches or upstream of an area with road crossings or structures in danger in the event of a flood. After the hydrology was completed for the 275 river reaches, floodplains were delineated for the 100 year return period. The results of the Flood Event Report are available following this report.

General Description of City of Peoria FRP Region

The City of Peoria region included thirty six census tracts. The geographical size of the region is 170 square miles and this area contains 1,972 census blocks. There are over 40,000 households and a total population of 111,310 people (2000 Census).

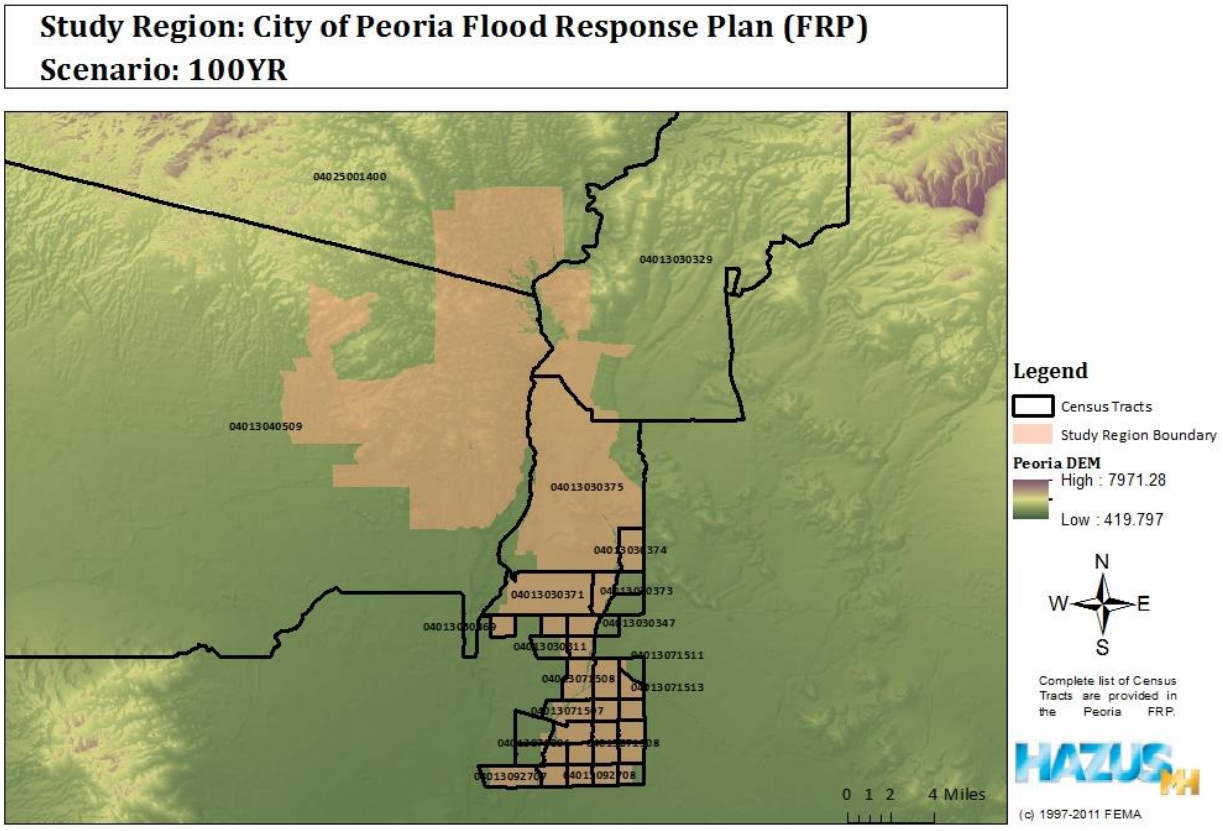


Figure 26: Study Region for the City of Peoria Flood Response Plan

City of Peoria Flood Response Plan 100-year Scenario

Total estimates for the 100-year Scenario are shown in below:

- Total economic loss 737.70 million dollars
- Residential 530.46 million dollars
- Commercial 154.49 million dollars
- Industrial 27.23 million dollars
- Others 25.53 million dollars
- 5,811 buildings moderately damaged
- 919 buildings completely destroyed
- 1 fire station moderately damaged
- 1 hospital moderately damaged
- 1 police station moderately damaged
- 23 school moderately damaged

- 1 fire station loss of use
- 1 hospital loss of use
- 12 schools loss of use
- 18,238 households displaced
- 51,893 people in need of shelter

The following figure (Figure 26) shows the boundary polygon and the riverine depth grid for the 100-year flow even in the City of Peoria FRP.

City of Peoria FRP Study Region Building Inventory

HAZUS estimates that within the City of Peoria FRP region there are 43,097 buildings with a total building replacement value (excluding contents) of 7,598 million dollars. Approximately 94.20% of the buildings (and 88.66% of the building value) are associated with residential housing. Table 19 shows the relative distribution of the value with respect to general occupancies by the Study Region. There are 3 hospitals, 72 schools, 19 fire stations, 2 police stations, and no emergency operation centers within this study region.

Table 19: Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	6,736,951	88.7%
Commercial	619,843	8.2%
Industrial	131,454	1.7%
Agricultural	15,168	0.2%
Religion	50,743	0.7%
Government	12,691	0.2%
Education	31,390	0.4%
Total	7,598,240	100.0%

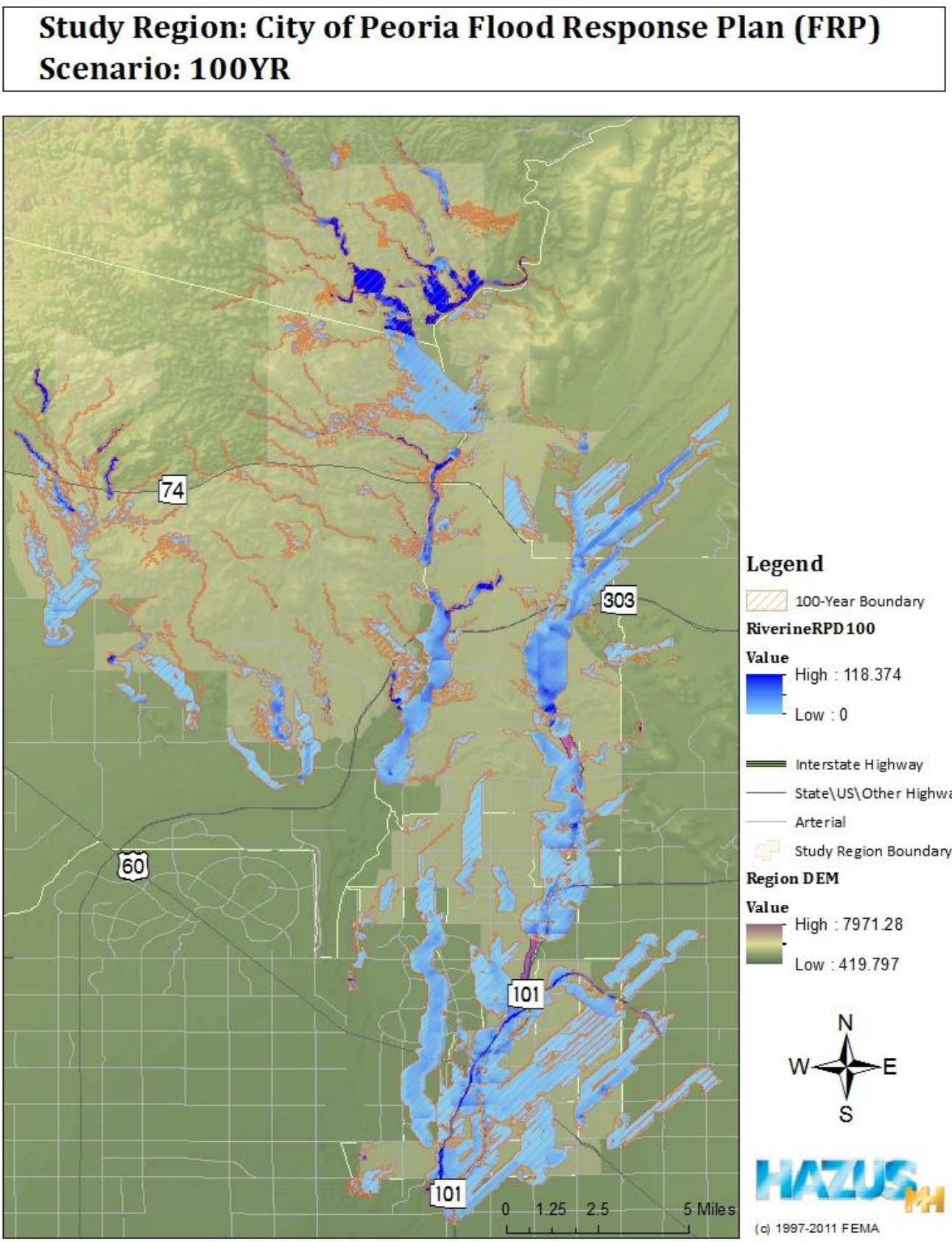


Figure 27: City of Peoria FRP 100-year Boundary

City of Peoria FRP 100-year Scenario Building Damage

In a 100-year flood event HAZUS estimates that about 5,811 buildings will be at least moderately damaged. This is over 36% of the total number of buildings in this study case. There are an estimated 919 buildings that will be completely destroyed. Table 20 summarizes the expected building damage by general occupancy for the buildings in this scenario. Table 21 summarizes the expected damage by general building type. Figure 28 shows the total general building stock damage to residential homes during the 100-year flood event.

Table 20: Expected Building Damage by Occupancy for 100-year Scenario

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	9	21.95	27	65.85	1	2.44	0	0.00	0	0.00	4	96.76
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	2	100.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	1	33.33	1	33.33	0	0.00	1	3.33	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00
Residential	9	0.16	916	15.84	3,042	52.29	456	7.88	447	7.73	914	15.80
Total	**20**		**944**		**3,044**		**456**		**448**		**919**	

Table 21: Expected Building Damage by Building Type for 100-year Scenario

	1-10		11-20		21-30		31-40		41-50		Substantially	
Building Type	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	3	33.33	4	44.44	0	0.00	0	0.00	0	0.00	2	22.22
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	70	7.43	872	92.57
Masonry	5	0.27	327	17.79	1,173	63.82	172	9.36	144	7.83	17	0.92
Steel	2	25.00	6	75.00	0	0.00	0	0.00	0	0.00	0	0.00
Wood	6	0.20	603	19.97	1,867	61.82	284	9.40	232	7.68	28	0.93

Study Region: City of Peoria Flood Response Plan (FRP)
Scenario: 100YR
General Building Stock Damage Total Count - Residental

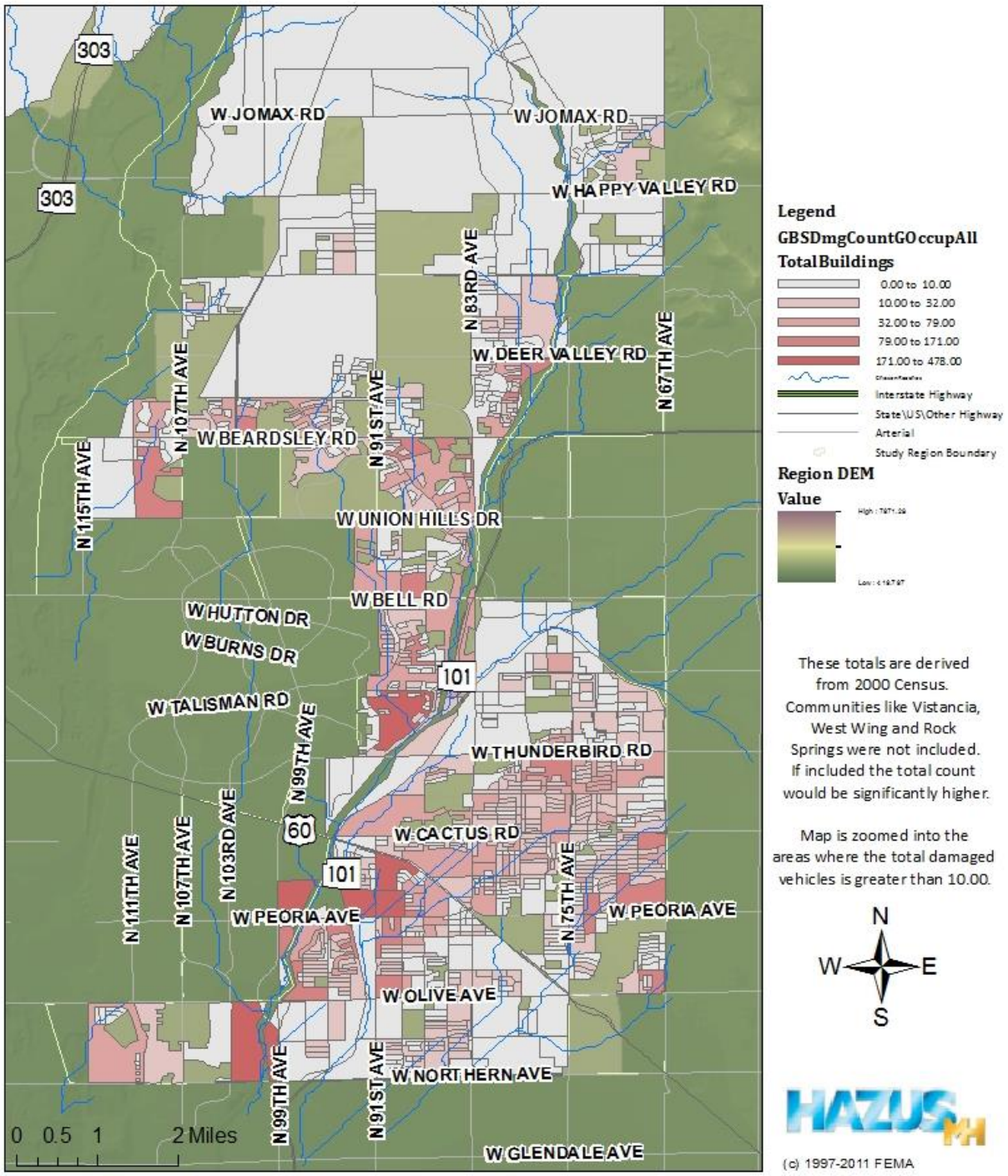


Figure 28: General Building Stock Damage County - Residential Structures

City of Peoria FRP 100-year Scenario Essential Facilities

In this flood scenario there is one fire station that will sustain at least moderate damage and loss of use. That fire station is the Gene Mason Memorial Fire Station 191. Although the Jomax Fire Station building could not be damaged in this scenario, there would be a loss of access due to New River and/or Rock Springs Wash. Before the flood analyzed in this scenario, the region had 92 hospital beds available for use. On the day of the scenario flood event, the model estimated that 34 hospital beds are available in the region. The one police station that would be moderately damaged is the Peoria Police Department located off of 83rd Ave and Peoria Ave. In this flood scenario 23 schools would be moderately damaged and 12 would that a loss of use. Table 22 summarizes the expected damage to essential facilities.

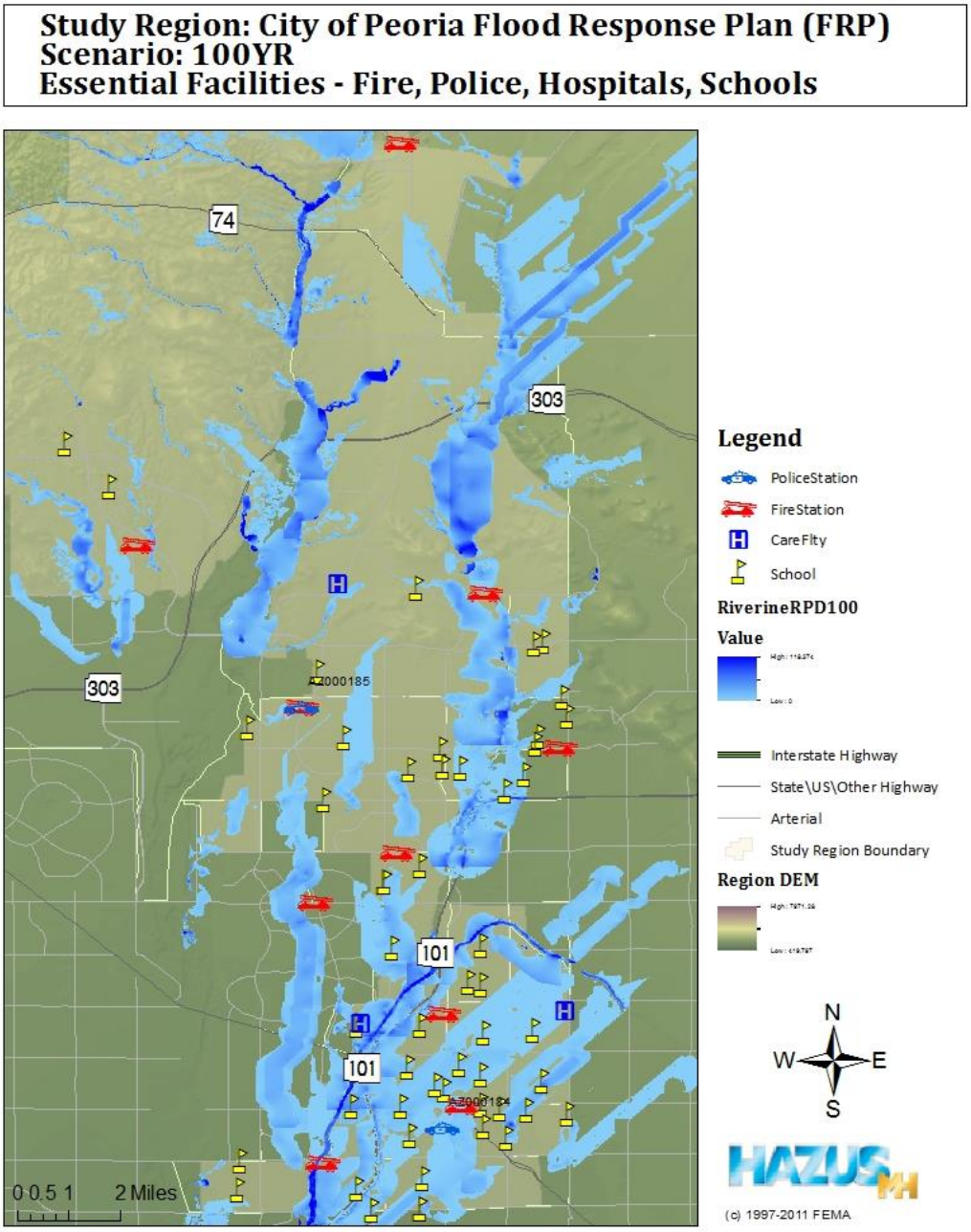


Figure 29: City of Peoria FRP 100-year Scenario Essentail Facilities

Classification	Total	Number of Facilities At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	19	1	0	1
Hospitals	3	1	0	1
Police Stations	2	1	0	0
Schools	72	23	0	12

Table 22: Expected Damage to Essential Facilities for 100-year Scenario

City of Peoria FRP 100-year Scenario Social Impact

HAZUS estimates 18,238 households will be displaced due to the flood. Displacement included households evacuated from within or very near the inundated area. Of these, 51,893 people (out of a total population of 111,310) will seek temporary shelter in public shelters. Figure 30 shows the location of the displaced population.

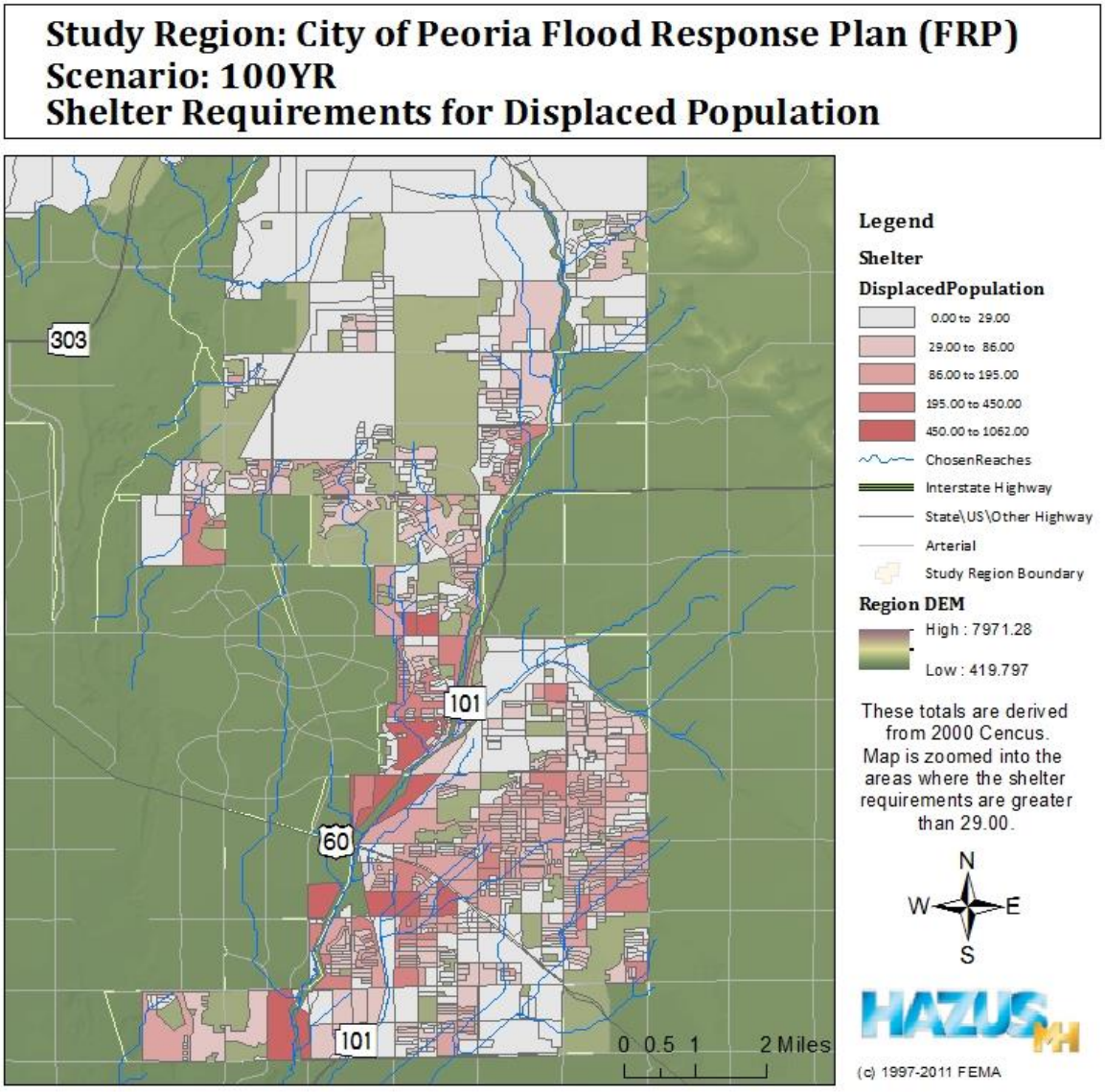


Figure 30: City of Peoria FRP 100-year Scenario Displaced Population

City of Peoria FRP 100-year Scenario Vehicle Impact

HAZUS estimates the total number of vehicles damaged due to the flood during the day is 4,551 and during the night the total would be 5,952. These vehicles are found in flood areas for several reasons including: they may be parked at residences, in structures, or on the street, they may be in parking facilities at transportation facilities, they may be in parking facilities at business locations, they may be in use at a business facility or site, or they may be parked at motor vehicle sales and repair facilities. These numbers can be greatly reduced with sufficient Flood Warning so vehicles can be moved from the floodplain. Figure 31 shows the location of the damaged vehicles during a daytime 100-year flood event.

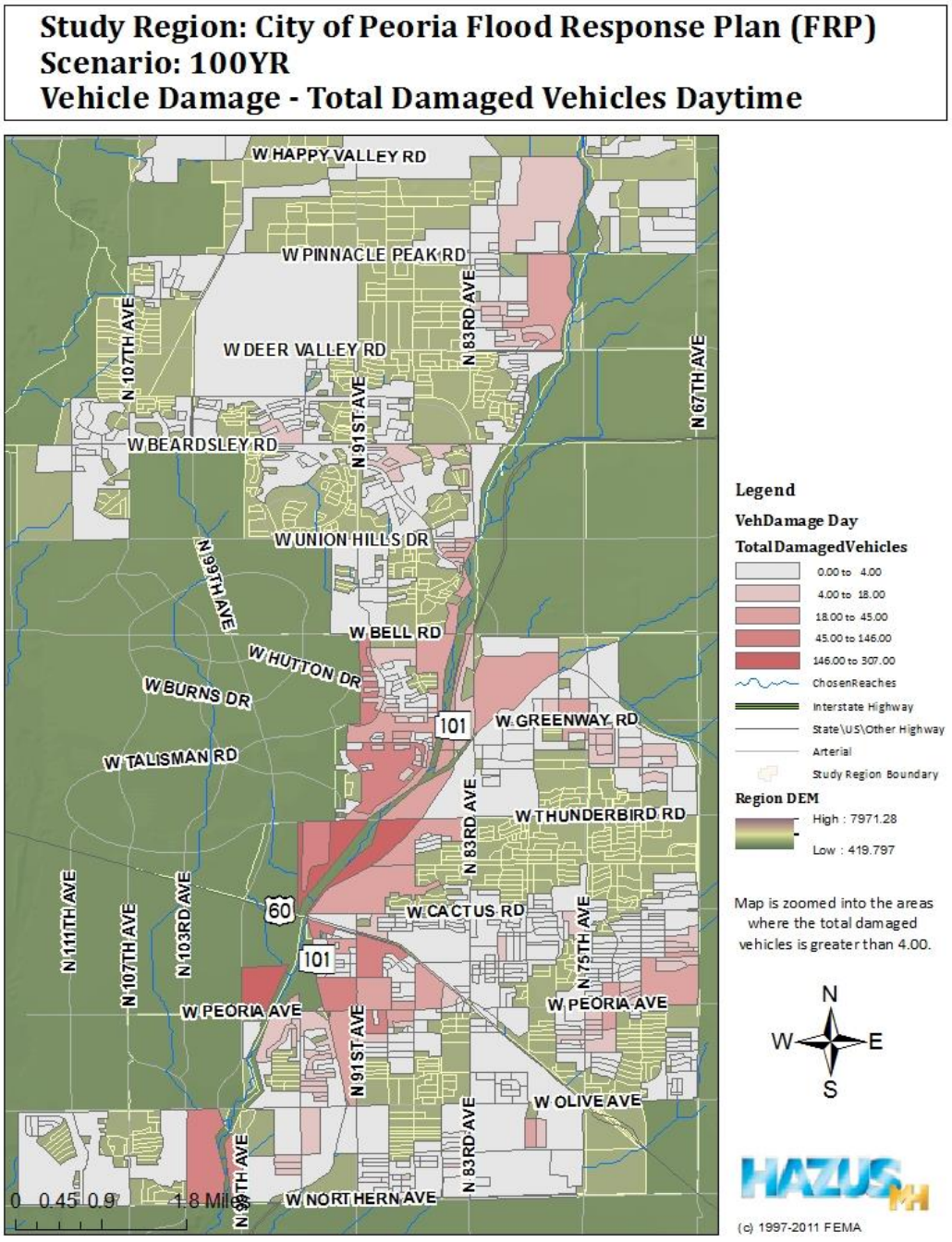


Figure 31: City of Peoria FRP 100-year Scenario Vehicles Damaged during the Day

City of Peoria FRP 100-year Scenario Economic Loss

The total economic loss estimated for the flood is 737.70 million dollars. The total building-related losses were 732.71 million dollars. 1% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 71.91% of the total loss. Table 23 provides a summary of the losses associated with building damage.

Table 23: Building-Related Economic Loss Estimates

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	317.96	38.86	9.17	3.96	369.96
	Content	210.61	110.56	14.63	20.17	355.97
	Inventory	0.00	2.91	3.44	0.41	6.79
	Subtotal	**528.58**	**152.37**	**27.23**	**24.54**	**732.71**
Business Interruption						
	Income	0.03	0.77	0.00	0.08	0.89
	Relocation	1.47	0.19	0.00	0.04	1.69
	Rental Income	029	0.11	0.00	0.00	0.41
	Wage	0.09	1.05	0.00	0.87	2.00
	Subtotal	**1.88**	**2.11**	**0.00**	**0.99**	**4.99**
ALL	**Total**	**530.46**	**154.49**	**27.23**	**25.53**	**737.70**

Depth of Floodwaters at Road Crossings in the City of Peoria FRP 100-year Scenario

The following tables show estimates of the depth of the flood water at three particular road crossings within the City of Peoria FRP 100-year scenario. The depths were derived using the ArcView GIS riverine depth raster file created by HAZUS during the floodplain delineation analysis. The depth grids where developed using HAZUS FIT Tool at Vistancia Boulevard at Twin Buttes Wash, New River at Bell Road and New River at Jomax Road.

Twin Buttes Wash at Vistancia Boulevard

Tables 24 and 25 show the results of the HAZUS depth elevation grid for Vistancia Boulevard at Twin Buttes Wash. The 10 ft elevation data from FCDMC and FEMA 100-year data was used to create this depth grid. The model could have predicted better depth under bridges if we had more precise elevation data (2 ft. for example). There is definitely a low lying area just north of the bridges that serves as a ponding area. This is within the Vistancia Recreation trail and shows the importance of making sure the trails get barricaded in the event of a flood. See Figure 32 for a map of the depth elevation grid at Twin Buttes Wash and Vistancia Boulevard.

Twin Buttes Wash at Vistancia Boulevard Eastbound Bridge			
Return Period	Greatest Depth (ft)	Average Depth (ft)	Width of Floodplain at Crossing (ft)
100	8.81	4.26	140

Table 24: Twin Buttes Wash at Vistancia Boulevard Depth of Floodwaters

Twin Buttes Wash at Just North of Vistancia Boulevard Westbound Bridge			
Return Period	Greatest Depth (ft)	Average Depth (ft)	Width of Floodplain at Crossing (ft)
100	27.00	14.60	266

Table 25: Twin Buttes Wash at Just North of Vistancia Boulevard Depth of Floodwaters

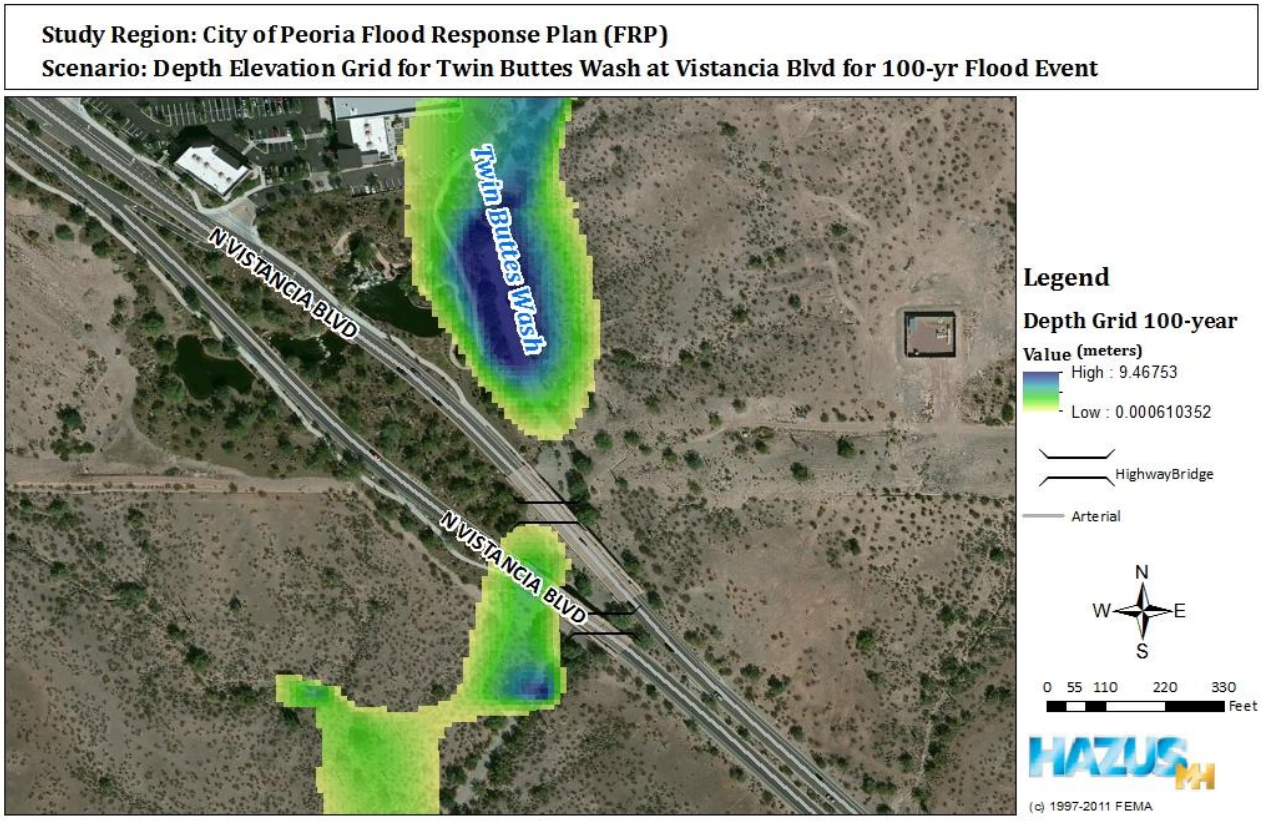


Figure 32: Depth Elevation Grid for Twin Buttes Wash at Vistancia Blvd.

New River at Bell Road

Table 26 shows the results of the HAZUS depth elevation grid for New River at Bell Road. The 10 ft elevation data from FCDMC and FEMA 100-year data was used to create this depth grid. See Figure 33 for a map of the depth elevation grid at this location.

New River at Bell Road			
Return Period	Greatest Depth (ft)	Average Depth (ft)	Width of Floodplain at Crossing (ft)
100	11.68	9.32	253

Table 26: New River at Bell Road Depth of Floodwater

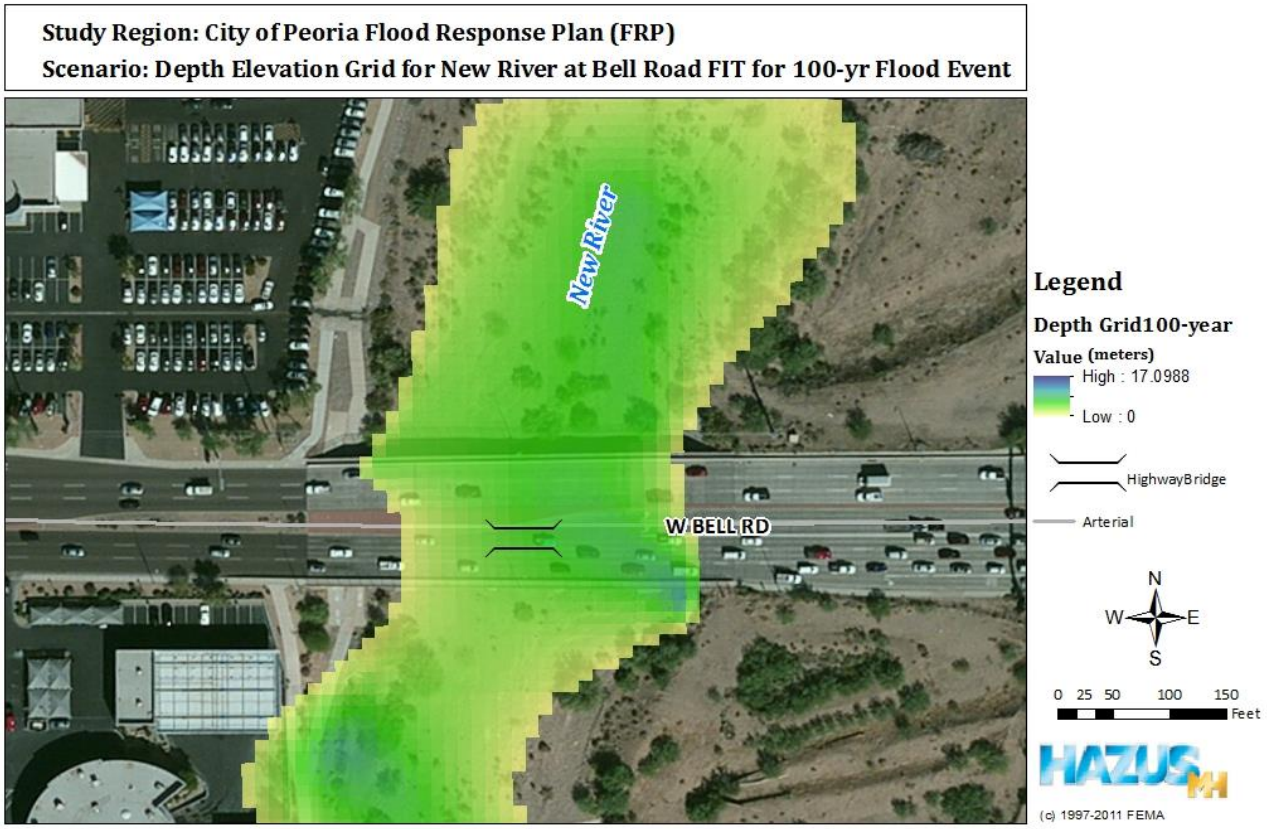


Figure 33: Depth Elevation Grid for New River at Bell Road

New River at Jomax Road

Table 27 shows the results of the HAZUS depth elevation grid for New River at Jomax Road. The 10 ft elevation data from FCDMC and FEMA 100-year data was used to create this depth grid. The model could have predicted better depth under bridges if we had more precise elevation data (2 ft. for example). See Figure 34 for a map of the depth elevation grid at this location.

New River at Jomax Road			
Return Period	Greatest Depth (ft)	Average Depth (ft)	Width of Floodplain at Crossing (ft)
100	9.1	~2.5	568

Table 27: New River at Jomax Road Depth of Floodwater

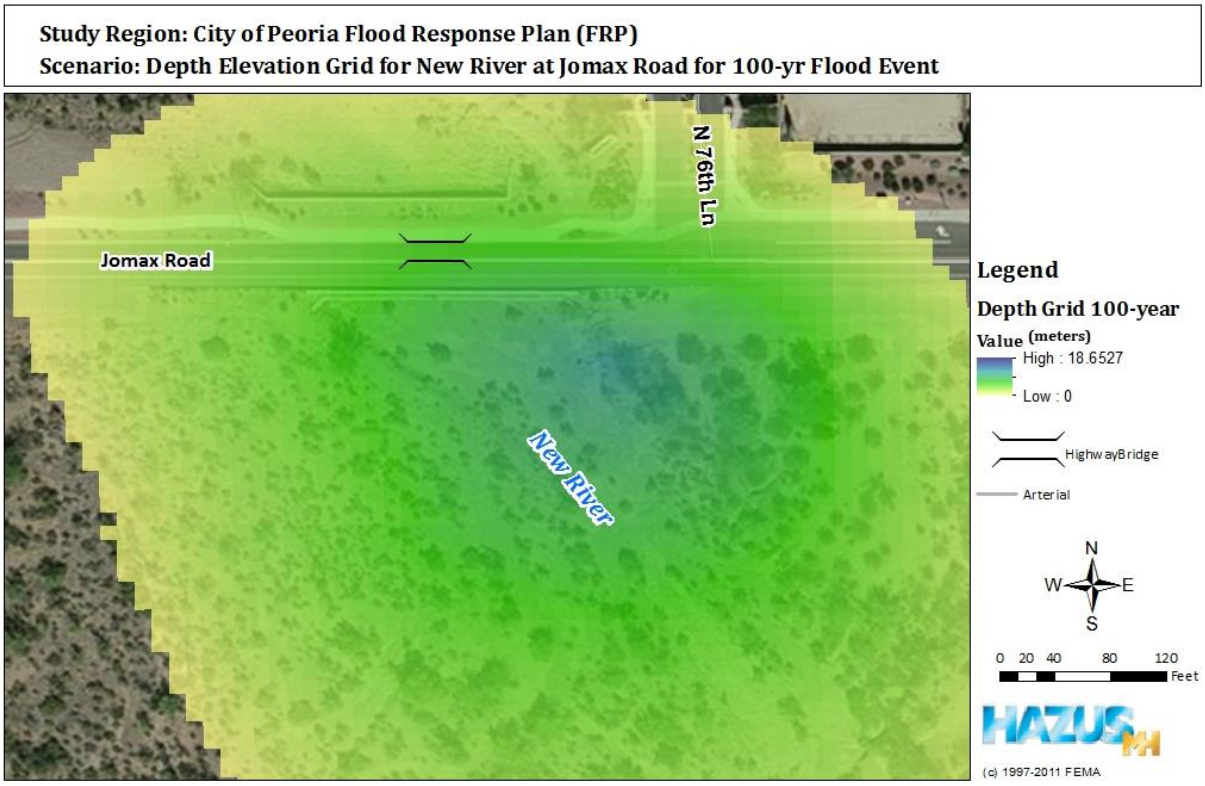


Figure 34: New River at Jomax Road Depth of Floodwaters

Impact of a Flood Warning System

With an effective flood warning system damage and losses throughout a community can be reduced. HAZUS-MH can estimate what percentage of losses can be avoided with an effective flood warning system. The Flood Model within HAZUS-MH uses the Day curve developed by the United States Army Corps of Engineers (USACE). This curve attempts to quantity the maximum level of damage reduction achievable based on the amount of time a flood warning has been available. The Day curve indicates a maximum loss reduction of 35% of total damage (e.g. structural, content and business inventory losses), and assumes a public response rate of 100%. The Flood Model also provides and input parameter to allow the user to account for the potential reduction of vehicle losses due to warning with a loss reduction up to 100%. The following figure (Figure 35) is a Day curve based on a scenario of riverine flooding in residential areas.

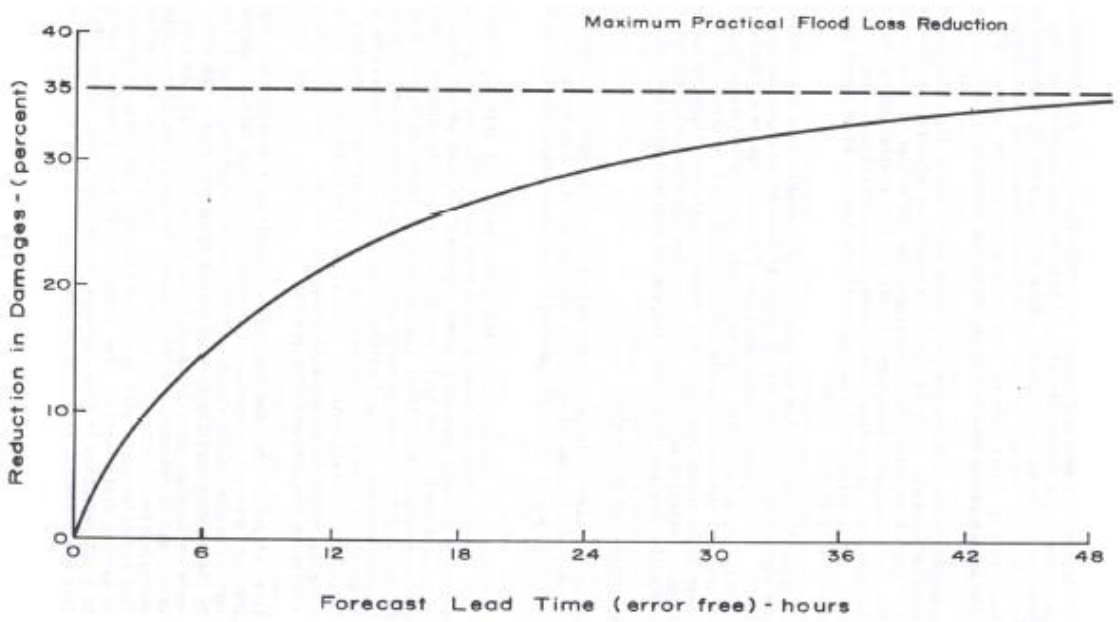


Figure 35: Day Curve for Residential Areas (Source: USACE, New York District, 1984)

The values selected for the City of Peoria HAZUS-MH Flood Warning were chosen assuming that the FRP plan was used and executed by the involved agencies in a timely manner. The lead forecast time was set for 12 hours and the reduction in damage to the structures, contents and business loss is estimated a 35%. The amount of vehicles removed from the floodplains was estimated at 100%.

Results of the HAZUS City of Peoria 100-Year Scenario

With an effective flood warning system the economic benefit would result in a savings of $256,050,000.00. This would be a 65.29% reduction and further illustrates the importance of an effective flood warning system.

For the City of Peoria FRP area the direct economic loss was estimated at $737,700,000.00. With a 65% reduction in damage to the structures, contents and business the loss would be reduced to $481,650,000. The expected economic loss for vehicles (both night and day time) was estimated at $1,165,806,000.00. With a 100% reduction in vehicle loss that number would be reduced to 0%. An effective flood warning could reduce the total economic loss from a 100-year event to $256,050,000.00 for this FRP area. Table 28 summarizes the total economic savings from a flood warning system within the City of Peoria.

Table 28: Total Economic Savings from a Flood Warning System in the City of Peoria

	Building Loss and Business Interruption	Vehicle Damage Day	Vehicle Damage Night	Total Building Loss, Business Loss and Vehicle Loss)
No Flood Warning				
City of Peoria 100-year Scenario	$737,700,000.00	$494,385,682.00	$671,420,311.00	
With Flood Warning				
City of Peoria 100-year Scenario	$481,650,000.00	$0.00	$0.00	
Total Economic Savings from a Flood Warning System	**$256,050,000.00**	**$494,385,682.00**	**$671,420,311.00**	**$1,421,856,000.00**

Summary of Databases in HAZUS-MH

HAZUS inventory consists of hazard data, boundary map data and a proxy for the general building stock (GBS) in the continental United States, Hawaii and the US held Territories. Additionally, HAZUS contains national data for essential facilities, high potential loss facilities, selected transportation and lifeline systems, agriculture, and vehicles and demographics.

Flood Model

In the Flood Model, USGS' National Elevation Database (NED) [1] is downloaded for use as topographical data.

Hydrologic calculations, population density, runoff coefficients and soils data are derived from "Compilation of GIS Data Layers for Flash Flood Forecasting" published by the Michigan Technological University for the National Weather Service (date unknown). This document and the "Water-Resources Investigations Report 94-4002"[2] are used for soil permeability. For default hydrologic regions, the source is the "Water-Resources Investigations Report 94-4002." The percentage of basin storage is derived from EPA RF3[3] (reach file 3) data files, and hydrologic region identifiers and regression equation parameters for computation from the "Water-Resources Investigations Report 94-4002." Random variables come from the Tables of K Values found on page 3-1 of USGS' "Guidelines for Determining Flood Flow Frequency", Bulletin #17B of the Hydrology Subcommittee, March, 1982.

Default river reaches and water sheds are derived from National Operational Hydrologic Remote Sensing Center data (developed by Michael Baker), 1998, default stream gauge locations from the U.S. Geological Survey WATSTORE Database[4], 1998, and frequency-based discharge data associated with the default reaches from the National Operational Hydrologic Remote Sensing Center and the "Water-Resources Investigations Report 94-4002."

- There is one USGS stream gauge located within the Upper New River/Skunk Creek FRP study area which is 09513780 New River near Rock Springs.

Raster data sets include percentage of forest cover derived from the "Compilation of GIS Data Layers for Flash Flood Forecasting" published by the Michigan Technological University for the National Weather Service (date unknown). High elevation indices, 24 hour precipitation, temperature and average precipitation data, runoff data and additional soil data for types A and D come from the "Water-Resources Investigations Report 94-4002."

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[1] The website address for the NED is http://ned.usgs.gov/.

[2] Jennings, M.E., Thomas, W.O., and Riggs, H.C., 1994. Nationwide Summary of U.S. Geological Survey regional regression equations for estimating magnitude and frequency of floods for ungaged sites, 1993: U.S. Geological Survey Water-Resources Investigations Report 94-4002.

[3] The website address for the EPA RF3 is http://www.epa.gov/waters/doc/rfindex.html.

[4] The WATSTORE Database is no longer and active database. U.S. Geological Survey now uses the National Water Information System (NWIS) as there database. The WEB link to NWIS is http://waterdata.usgs.gov/az/nwis/inventory. The 1998 data book, Water Resources Data, Arizona, Water Year 1998 Water-Data Report AZ-98-1 shows all the sites that were published in the 1998 report and were included in the WATSTORE Database.

Boundary Maps

HAZUS contains GIS boundary maps for the U.S. and the Territories with four GIS map layers: states, counties, census tracts and census blocks. This data set was developed from the 2000 version of Census TIGER/Line® files.[5]

General Building Stock

The key General Building Stock databases in HAZUS include square footage by occupancy, building count by occupancy and general occupancy mapping. For these databases, residential structures are derived from Census 2000 and non-residential structures are derived from Dun & Bradstreet (D&B). Three reports from the Department of Energy (DOE) were used in defining regional variations in characteristics such as number and size of garages, type of foundation, and number of stories. The inventory's baseline floor area is based on a distribution contained in the DOE's Energy Consumption Report.

D&B utilizes the Census Bureau Tiger/line files to geolocate and reference businesses in their database by the reported address. D&B aggregated the data to the Census block level utilizing the assigned block polygon from the geolocation process. The list of documents used to develop the general building stock inventory is as follows:

- Census of Population and Housing, 2000: Summary Tape File 1B Extract on CD-ROM prepared by the Bureau of Census.
- Census of Population and Housing, 2000: Summary Tape File 3 on CD-ROM prepared by the Bureau of Census.
- Dun & Bradstreet, Market Analysis Profile aggregated by Standard Industrial Classification (SIC) Code Clusters, July 2006.
- Department of Energy, Housing Characteristics 1993. Office of Energy Markets and End Use, DOE/EIA-0314 (93), June 1995.
- Department of Energy, A Look at Residential Energy Consumption in 1997, DOE/EIA-0632(97), November 1999.
- Department of Energy, A Look at Commercial Buildings in 1995: Characteristics, Energy Consumption, and Energy Expenditures, DOE/EIA-0625(95), October 1998.

Essential Facilities

Essential facilities in HAZUS include hospitals, police stations, fire stations, schools and emergency operations centers classified by building structure type and occupancy class.

The police station and fire station datasets were developed from geocoded data from 2001 based on the SIC for the entire United States provided by InfoUSA Inc.[6] The attribute information provided by InfoUSA

[5] The contact information for the Census Bureau is: U.S. Department of Commerce, U.S. Census Bureau, Geography Division. 8903 Presidential Parkway, Room 303 WP I, Upper Marlboro, Maryland, 20772. Telephone (301) 457 - 1228/ Email Address: tiger@census.gov. The U.S. Census Bureau website address is http://www.census.gov/geo/www/tiger/index.html.

[6] The contact information for the InfoUSA, Inc is: InfoUSA, Inc. 5711 S 86th Circle, PO Box 27347, Omaha, NE 68127-0347, (402) 930-3500. The InfoUSA, Inc website address is http://www.infousa.com/.

Inc. for each police station and fire station facility includes name, address, city, zip, state, and geographical coordinates.

The schools data set was developed from the 2000 Public Elementary/Secondary School Universe Survey Data and the Private School Universe Survey Data maintained by the National Center for Education Statistics, U.S. Department of Education.[7] A proprietary geocoding application was used to assign geographical coordinates to each school based on its address. South Carolina schools data from 2004 was provided by the South Carolina Emergency Division [8] (SCEMD).

The care facilities dataset was developed from American Hospital Association (AHA) [9] data from 2000. AHA provided information on hospitals for the entire United States. The attribute information provided by AHA for each medical care facility includes: the number of beds, name, address, city, zip, state, and geographical coordinates. South Carolina hospital data from 2004 was provided by the South Carolina Emergency Division.

The emergency operations centers (EOC) database is a combination of data provided by InfoUSA Inc. and geocoded data provided by FEMA. The InfoUSA Inc data is based on the SIC for the entire United States. The attribute information provided by InfoUSA Inc for each emergency operation center facilities includes: name, address, city, zip, state, function, and geographical coordinates. The data from FEMA includes: contact, name, address, city, zip, state, and telephone number.

High Potential Loss Facilities

High potential loss facilities include dams and nuclear power plants. The dams' dataset is based on the 1999 version of the National Inventory of Dams database, from the U.S. Army Corps of Engineers (USACE)[10]. The nuclear facilities dataset was developed from 2000 data compiled by the U.S. Nuclear Regulatory Commission (NRC) [11] on nuclear reactors. Military facilities are not available in the current HAZUS default inventory.

Transportation Systems

Transportation systems in HAZUS include highways, railways, light rail, bus, ports, ferries and airports. The inventory data required for these include the geographical location, and classification of system components.

Highway transportation systems consist of roadways, bridges, and tunnels. The highway bridges and tunnels database was developed from the 2001 version of the National Bridge Inventory (NBI) database

[7] The contact information for the National Center for Education Statistics: 1990 K Street, NW, Washington, DC 20006, USA, Phone: (202) 502-7300. The NCES, Inc website address is http://nces.ed.gov/

[8] For metadata information on the South Carolina Data, contact South Carolina Emergency Division, 1100 Fish Hatchery Red, West Columbia, SC 29172, Phone: (803) 737-8500.

[9] The contact information for the American Hospital Association is One North Franklin: 27th Floor, Chicago Illinois 60606. Phone: (800)242-2626. The AHA website address is http://www.ahadata.com/ahadata_app/index.jsp.

[10] The contact information for USACE is: U.S. Army Corps of Engineers, 7701 Telegraph Road, Alexandria, VA 22315-3864. Phone: (703) 428-6766.

[11] The website address for the NRC is http://www.nrc.gov/reactors/power.html.

provided by the Federal Highway Administration, Office of Bridge Technology.[12] Major highway segments were developed with data from the 2000 version of TIGER/Line files, produced by the U.S. Census Bureau.

Railway transportation systems consist of tracks, bridges and tunnels, and stations, fuel, dispatch and maintenance facilities. The railway track segments were developed with data from the National Rail Network database obtained from the Bureau of Transportation Statistics (U.S. Department of Transportation)[13]. Railway system bridges and tunnels were extracted from the 2001 version of the National Bridge Inventory (NBI). The railway facilities database was developed with 1998 data from the Amtrak Stations database and the Intermodal Terminal Facilities, obtained from the Bureau of Transportation Statistics (U.S. Department of Transportation). The Amtrak Stations database is a geographic data set containing Amtrak intercity railroad passenger terminals in the United States. The Intermodal Terminal Facilities data set contains geographic data for trailer-on-flatcar (TOFC) and container-on-flatcar (COFC) highway rail transfer facilities in the United States.

Light railway transportation systems consist of tracks, bridges and tunnels, and stations, fuel, dispatch and maintenance facilities. The light railway database was developed with 2000 data from the Fixed-Guide way Transit and Ferry Network database, obtained from the Bureau of Transportation Statistics (U.S. Department of Transportation).

Bus transportation systems consist of urban stations fuel facilities, dispatch and maintenance facilities. The bus facilities data set was developed from geocoded data from 2001 provided by InfoUSA Inc. based on the SIC for the entire United States. Attribute information for each bus station facility includes: name, address, city, zip, state, and geographical coordinates.

Port and harbor transportation systems consist of waterfront structures, cranes/cargo handling equipment, warehouses and fuel facilities. The port facilities data set was developed from the 2000 dataset of Port and Waterway Facilities obtained from the U.S. Army Corps of Engineers/CEIWR, Navigation Data Center, Ports and Waterways Division[14].

Ferry transportation systems consist of waterfront structures, passenger terminals, warehouses, fuel facilities, and dispatch and maintenance facilities. The ferry facilities dataset was developed from the Port and Waterway Facilities database obtained from the U.S. Army Corps of Engineers/CEIWR, Navigation Data Center, Ports and Waterways Division.

Airport transportation systems consist of runways, control towers, terminal buildings, parking structures, fuel facilities, and maintenance and hanger facilities. Airport runways and facilities datasets were developed from 1999 data obtained from the Bureau of Transportation Statistics (U.S. Department of Transportation), Federal Aviation Administration. Heliports are not included.

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[12] The contact information for the NBI is The Federal Highway Administration, 400 7th Street, SW, Washington, DC 20590. The website address of Federal Highway Administration is http://www.fhwa.dot.gov/bridge/bripro.htm.

[13] The contact information for the BTC is: Bureau of Transportation Statistics, 400 7th Street, SW, Room 3103, Washington DC 20590. Phone: (800) 853-1351. The BTC website address is http://www.bts.gov/programs/geographic_information_services/.

[14] The contact information for the USACE is: Department of the Army Corps of Engineers, CEIWR-NDC-N, 7701 Telegraph Road, Alexandria, Virginia 22315-3868. The USACE website address is http://www.usace.army.mil/Pages/Default.aspx.

Lifeline Utility Systems

Utility systems include potable water, wastewater, oil, natural gas, electric power, and communication systems. The inventory data required for these include the geographical location and classification of system components.

Potable water systems consist of pipelines, water treatment plants, control vaults, control stations, wells, storage tanks, and pumping stations. Wastewater systems consist of pipelines, wastewater treatment plants, control vaults, control stations, and lift stations. Oil systems consist of pipelines, refineries, control vaults, control stations, and tank farms. Natural gas systems consist of pipelines, control vaults, control stations, and compressor stations. An electric power system consists of generating plants, substations, distribution circuits, and transmission towers.

Each of these datasets was developed from 2001 data obtained through the Environmental Protection Agency[15] (EPA) Envirofacts Data Warehouse Location Reference Tables (LRT) tool based on SIC. The attribute information provided by LRT includes: name, address, city, zip, state, and geographical coordinates. South Carolina potable water, waste water, oil and natural gas pipelines data c2001 were provided by the South Carolina Emergency Division (SCEMD).

The distribution pipelines database for potable water, waste water and natural gas, which is aggregated at the census tract level, was developed based on the assumption that the number of distribution lines is correlated to the number of local streets. This approximation is considered fairly accurate in urban areas, but less so in rural areas because of the use of onsite components such as water wells, septic tanks and propane gas tanks.

Communication systems consist of communications facilities, communications lines, control vaults, switching stations, Radio/TV station, weather station, or other facilities. The communication facilities dataset was developed from the 2001 Broadcast Auxiliary Microwave file obtained from the Federal Communication Commission (FCC)[16].

Hazardous Materials and Agricultural Products

The hazardous materials (Hazmat) facilities dataset is based on the 1999 version of the Environmental Protection Agency (EPA) Toxic Release Inventory database[17].

Agricultural Products

The agriculture products inventory for the Flood Model is based on two National datasets for general distribution of crops by type, average yield, unit price, and harvest price: the National Resources Inventory[18] (NRI) and the National Agriculture Statistical Service[19] (NASS).

[15] The EPA website address is http://www.epa.gov/enviro/html/locational/lrt/ez.html.
[16] The FCC website address is http://wireless.fcc.gov/.
[17] The contact information for EPA is: Environmental Protection Agency, Ariel Rios Building, 1200 Pennsylvania Avenue, N.W., Washington, DC 20460. Phone: (202)0260-2090. The EPA Toxics Release Inventory (TRI) Program website address in http://www.epa.gov/triinter/tridata/tri99/.

Vehicle Data

Parking generation rates are used to associate the number of parked vehicles to square footages of different types of occupancy groups during a flood event. Vehicle distributions are estimated for daytime and nighttime, with daytime assumed to be normal business hours. Occupancy-related data is based on the American Planning Association's "Off-Street Parking Requirements: A National Review of Standards (PAS 432) by David Bergman (1991) and the National Personal Travel Survey[20] (NPTS) - 1995, and related projects of private organizations. Vehicle class estimates are compiled from the National Automobile Dealers Association[21] (NADA), the U.S. Department of Transportation's Truck Size and Weight Study (TSWS) - 2000[22], and the 1995 National Personal Transportation Survey (NPTS). The distribution of vehicle age and percentage of trucks versus cars were taken from NADA, with further distribution among trucks by size from TSWS. Dollar valuation of vehicles is based on the 2001 NADA data and the 2001 Ward's Automotive Yearbook[23].

Direct Economic and Social Loss

The datasets for calculating direct economic loss in HAZUS include building, content and inventory valuation by occupancy and repair times, operational valuations (business, personal and rental income and disruption costs) and lifeline valuations at the census block level for the fifty states and the District of Columbia. The building/content inventory valuation dataset was developed by applying RS Means[24] replacement values for typical building floor areas and construction for each specific occupancy. The (Means) County Location Factor data set derived from the 2006 RS Means Square Foot Costs was used to modify the building valuations for each occupancy for major metropolitan areas in addition to a national data set of county specific modifiers from the Means zip-code based data generated by Applied Research Associates. The business loss dataset is based on Dun & Bradstreet (2006), Means Cost Data (regional cost modifiers), income and floor area factors from DOE data and the latest addition of the U.S. County Business Patterns database (e.g., income, employment and output data). ATC13 and ATC25[25] were used for lifeline valuations and R.S. Means for location modifiers for the replacement cost for facilities and the repair costs. Datasets for social loss (displaced households and casualties) in HAZUS are derived from the 2000 Census.

Indirect Economic Data and Demographic Data

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[18] The website address for the NRI is http://www.nrcs.usda.gov/technical/NRI/. The database represents and average of the 1977, 1982, 1987, 1992 and 1997 data.

[19] The website address for the NASS is http://www.nass.usda.gov/. The data is from 2000.

[20] The website address for the NPTS is http://www.bts.gov/programs/national_household_travel_survey/.

[21] The NADA Data is a comprehensive statistical analysis of the franchised new-vehicle dealership industry conducted by the National Automobile Dealers Association. It is published annually in the August issue of NADA's Automotive Executive magazine. The one used for HASUS was published in 2001. The WEB link for back articles is http://www.autoexecmag.com/current_articles/.

[22] The website address for the TSWS is http://www.fhwa.dot.gov/policy/otps/truck/.

[23] The website address for the Ward's Automotive Yearbook is http://wardsauto.com/way.

[24] The contact information for RS Mean's is: RSMeans Company, Inc. Construction Publishers & Consultants, Construction Plaza, 63 Smiths Lane, Kingston, MA 02364-080. Phone: (781) 585-7880. The RS Means website address is http://rsmeans.reedconstructiondata.com/.

[25] The website address for the Applied Technology Council is http://www.atcouncil.org/.

HAZUS indirect economic data refers to the post-disaster change in the demand and supply of products, change in employment and change in tax revenues. Data are based on IMPLAN data for the U.S. and the Territories that were acquired from the Minnesota IMPLAN Group, Inc.[26] and compiled in 1997.

The demographics table in HAZUS provides housing and population statistics at the census block level including distributions of income, population, demographics, occupancies, and housing units based on the 2000 U.S. Census. Some employment data is from Dun & Bradstreet.

Specific Model Requirements and Capabilities

HAZUS-MH provides a rough estimate of potential economic losses. It is a dynamic modeling tool that allows the user to ask "what if" questions and is helpful to prepare for the inevitable. It is a very complicated and computer-intensive software program. However HAZUS-MH isn't calibrated to a specific economic situation, and is not a substitute for an engineering-based flood study.

HAZUS-MH's capabilities include: calculating flood depths in both riverine and coastal contexts, modeling losses to the census block level, examining multiple dimensions of loss and analyzing multiple flood recurrence intervals or specific discharge amounts. The general building stock is uses the 2000 Census of Housing data for buildings, Dun & Bradstreet data for non-residential buildings, US Department of Energy for regional differences in square footage, construction types, etc. There are also a limited number of stream gauges within a study area that are used within the analysis.

To determine a riverine flood depth one must create a flow grid from DEM, identify stream reaches from the flow grid, associate each reach with a drainage area, identify stream gauges in the drainage area, approximate the floodplain for each reach, create a set of flood depth cross sections and interpolate from cross sections to grid cells.

HAZUS-MH can define loss estimates. It uses depth-damage curves created from occupancy class, foundation type, and assumed first floor elevation and the depth of flooding throughout the census block. It also uses National Floodplain Insurance Program (NFIP) claims to create depth-damage curves for "typical" construction types and matches up buildings in a block and depth within a block to depth-damage curves to estimate damage.

To set up a study case one must first define the stream reaches. A minimum drainage area and a flow direction is created from the DEM based on the 8-direction pour point model following the steepest slope neighbor. Then, a flow accumulation grid is created. Finally, streams are derived from the flow accumulation grid as those as those grid cells into which than a threshold number of cells drain into. For a 30m terrain grid, a typical threshold value is about 5000 cells.[27]

A study case is then created with a unique name and description. These must have different names because there can be multiple study cases/scenarios within a one regional study area. One then selects the reaches that will be included in the study case. For a riverine flood, hydrologic analysis can be run next. The objective of the hydrologic analysis is to estimate the distribution of water once it lands via precipitation and determine discharge values in streams. In general, this step uses several methods which include analyzing stream gauge data to transform historical peak discharges into flood frequency

[26] The website address for the IMPLAN is http://www.implan.com.
[27] Riverine Flood Modeling in HAZUS-MH: Overview of the implementation, Subrahmanyam Muthukumar

curves, or regression functions determining discharge as a function of other variables, or numerical models [HEC-1, SWMM, MIKE11 etc.] to mimic hydrologic processes. HAZUS-MH implements hydrologic analysis through built-in regression equations to determine discharge-frequency relationships for each reach and include gauge and main stream adjustments. Rainfall-runoff modeling is not implemented. Regression equation parameters include derived variables [catchment area, mean catchment elevation and slope, and channel length] and default data parameters [temperature, precipitation, soil type, forest cover and snowfall]. Where applicable, regression results are adjusted using data from the 11,000 stream gauges that accompany HAZUS-MH. The output is a peak discharge table, with discharges computed at each reach's upstream and downstream nodes for return periods of 2, 5, 10, 25, 50, 100, and 500 years. [28]

The hydraulic analysis uses the derived discharge values and stream channel morphology and computes flood elevations at cross-sections which delineates the floodplains. This is done by recurrence intervals, discharge values and by annualized loss. In general, this step is implemented using Manning's equation or by numerical models [HEC-2, HEC-RAS, SWMM, etc.]. Inputs include discharge, cross-section descriptions [channel slope, cross-section geometry and friction factors for inundated areas], and 2-D flow fields, varying Manning's n, bridge geometries, expansion/contraction coefficients and sub-critical/super-critical flow. Outputs include flood elevations at cross-sections, energy head, flood velocity, flood depths and extents. The model is greatly simplified in HAZUS-MH. Inputs include peak discharge, cross-section geometries, 1-D flow field and constant Manning's n for sub-critical flow. Only flood elevations at cross-sections, flood depth and extent grids are generated. The process is iterative. The initial floodplain is estimated by buffering the reaches [buffer distance = $\mathbf{10 * Q^{0.5}}$]. The flow centerline is determined and cross-section lines are placed normal to the flow centerline at intervals of 1000'. Manning's equation is used to determine flood elevations at the cross-sections. A flood surface is determined by interpolating elevations between cross-sections. The DEM is subtracted from the flood surface and the resulting flood conveyance limits are compared with the extents of the depth grid. If necessary, the reach buffers are expanded and the analysis repeated till congruence between conveyance limits and the depth grid is achieved.

Hydraulic analysis may be performed for a single return period, multiple return periods or for a specific discharge – this choice usually dictates the number of reaches that may safely be used in the analysis. Spatial outputs include depth grids by return periods, cross-sections, conveyance boundaries and water elevation points. After the hydraulic analysis, HAZUS-MH allows what-if scenarios including levee-based DEM raising, or regulating flow by modifying the default discharge-frequency curves.

Analysis and loss estimation range from building stock damage to casualties to essential facility damage to debris removal cost. Inventory parameters, damage parameters, restoration parameters and analysis parameters are described below.

Inventory variables consist of the buildings, essential facilities, transportation and utilities, demographics, hazardous materials, agricultural commodities and vehicles aggregated to the block level. HAZUS-MH replacement value functions for the general building stock are developed from R. S. Means "Square Foot Costs". These functions contain information on the full replacement value as well as the depreciated replacement value. Full replacement value represents the engineering cost to rebuild a structure and is classified by economy, average, custom and luxury structure types. Depreciated value is the remaining value of a structure based on age and is classified by good, average and poor conditions.

[28] Riverine Flood Modeling in HAZUS-MH: Overview of the implementation, Subrahmanyam Muthukumar

The depreciated value reflects the insured value of the property. These definitions/functions are based on individual structures, while HAZUS-MH deals with data aggregated to the block level. The true depreciated value of a block will be a combination of the replacement and depreciation cost models.

For single-family structures, depreciated values are computed at the blockgroup level from default curves of depreciation percent against median age and classified by condition. The overall condition for blockgroup structures is determined by the ratio of blockgroup income to county income. In the case of non-single-family structures, depreciated values are based on construction type, use and observed age. Under default conditions, the observed age is assumed similar to residential uses. Depreciation parameters encoded within HAZUS-MH may be modified by the user. Default mapping schemes that convert specific occupancy types into building type with foundation types and first floor heights may be modified by the user. Default agricultural data are provided by National Resources Inventory [NRI] and National Agricultural Statistical Survey [NASS] and compiled into sub-county polygons formed by the intersection of 8-digit HUCs with county boundaries. HAZUS-MH uses the available land use/land cover data and includes default data on crop types, quantities, yields, unit prices and harvest costs after removing non-agricultural areas. All crop types and associated attributes may be modified by the user. The number and type of vehicles are estimated from square footage to vehicle ownership ratios using methods adopted by most MPOs for their transportation planning needs. Vehicles are classified by car, light truck or heavy truck typologies and by age [new/old] and estimated at the block level for day-time and night-time periods.

Damage to inventory categories is based on built-in depth-damage curves. These depth-damage curves relate damage as percent of replacement cost against effective flood depths – effective flood depths are quantified as the height of flood waters above the first floor. Every inventory item is associated with a default depth-damage curve. For the general building stock, each of the 33 specific occupancy classes and their variations by foundation type and building height have associated curves. For bridges, utilities and vehicles, depth-damage curves are derived from historic data and expert opinion. Agricultural depth-damage curves are derived from USACE district curves and other models such as USACE IWR, USACE AGDAM, etc. Agriculture damage curves are associated with additional parameters including flood depth, duration of inundation, flood date relative to crop cycle and crop type. All depth-damage curve values are encoded as tables and may be modified by the user.

As in the other cases, HAZUS-MH has built-in restoration parameters that are based on occupancy restoration timelines. For some inventory items, these curves indicate an assessment of the functionality. All restoration curves have values for the maximum restoration time for 100% operations. Restoration parameters are tabulated and may be modified by the user, but without in-depth domain knowledge, it is safer to use defaults.

HAZUS-MH has an analytical parameter modification interface to alter estimations of debris, shelter requirements, direct and indirect economic losses. Casualty estimation has been deferred.

Estimated weights of debris generated are limited to building-related components [building finishes, structural elements and foundation materials] and does not include vegetation, sediment or building contents. Default debris parameters are listed by specific occupancy classified by foundation type and tabulated for specific flood depth intervals.
Default shelter parameters are based on total population displaced owing to evacuation/flooded roads. Evacuation factors include access restriction heights and additional public safety evacuation buffers.

Displaced populations may be weighted by demographic factors including income, age, ethnicity and home ownership, and by utility outages as percent impacted households.
Direct economic loss parameters have been generated only for occupancies with inventory considerations and are based on gross sales data for 2002. Direct economic loss parameters deal with losses caused primarily by business interruption and take into account restoration times for business interruption interval estimation.
Estimates of indirect economic losses are based on simplified models of a synthetic economy classified by type and size. Employment numbers are based on the Bureau of Economic Analysis 2002 figures for counties, and include unemployment rate, level of outside aid/insurance, interest rates on loans and reconstruction costs.
All analysis parameters may be modified by the user. Additionally, all estimated losses may be modified based on flood warning studies conducted by the USACE in the 1960s. Flood warnings include default curves relating damage reduction to flood forecasts. Editable warning parameters for damage reduction include flood warning lead time, warning dissemination and response rates. [29]

The report results are available with maps or tables and every variable calculated can be mapped by census block.

[29] Riverine Flood Modeling in HAZUS-MH: Overview of the implementation, Subrahmanyam Muthukumar

Appendix G

Google Map/Wall Map/Field Maps

City of Peoria's FRP Google Map

Desktop Version

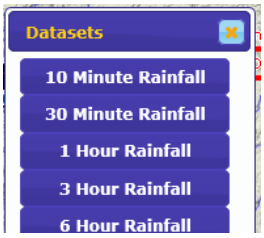
This map was designed using Google's JavaScript API Version 3 (v3). We used this platform because it is specifically designed to be fast on mobile devices, as well as traditional desktop browser applications. This is a free service that lets you embed Google Maps into your own website. It's available to any website that is free to customers.

The direct link to the Desktop/Full Version of the map is http://alert.fcd.maricopa.gov/alert/Google/v3/peoria.html. This version works well on all tablets. If open this map on a mobile device the mobile version of the map will load. See the Elements of the Peoria FRP Mobile Google Map section for details on the mobile version of the map.

Elements of the Peoria FRP Google Map

1. Top of Map:

- Menu Bar: Dataset, Layers, Historic, Info & Refresh. Once open click the "x" button to close the box.



- Data Description Bar: Includes Data Date, Time, Product and Radar Information. Radar is by default turned off.
- FCDMC Title and Logo
- NWS Warnings Legend is displayed by default on the map. If a warning is issued it will automatically display the polygon on the map.

- This map auto refreshes every two minutes updating the layers that are overlaid on the map.

2. Map Icons:

- **M** means missing data, gauge hasn't reported in 6 hours or more.

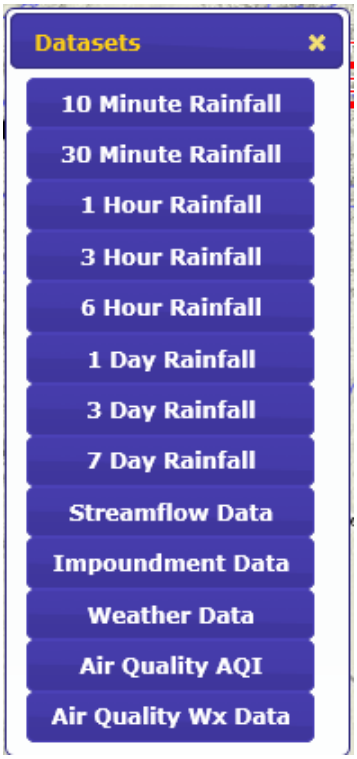
3. Map Navigation:

- Navigate pages just as you would in Google Maps.
- You can turn map to Satellite view with or without labels, and Regular Terrain Map with or without labels.

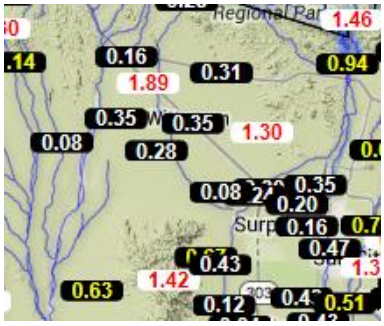
- Zoom Drag Tool – Hold down the Shift button and a + will show up on the map. Click your mouse and draw a box. When you let up on your mouse button the map will zoom you right down to where you want to be.

4. The Menu:

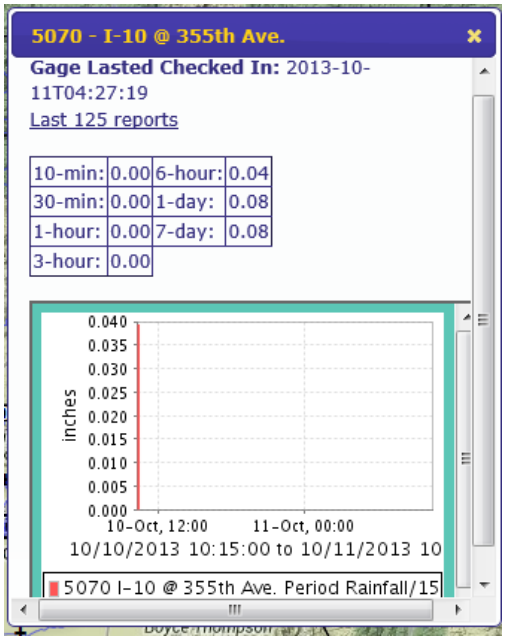
- **Dataset**



  - All Rainfall Markers will display as black with white text. At 0.50" of rain text turns yellow, at 1.25" of rain text turns red, and at 2.00" of rain the markers turn white with red text.

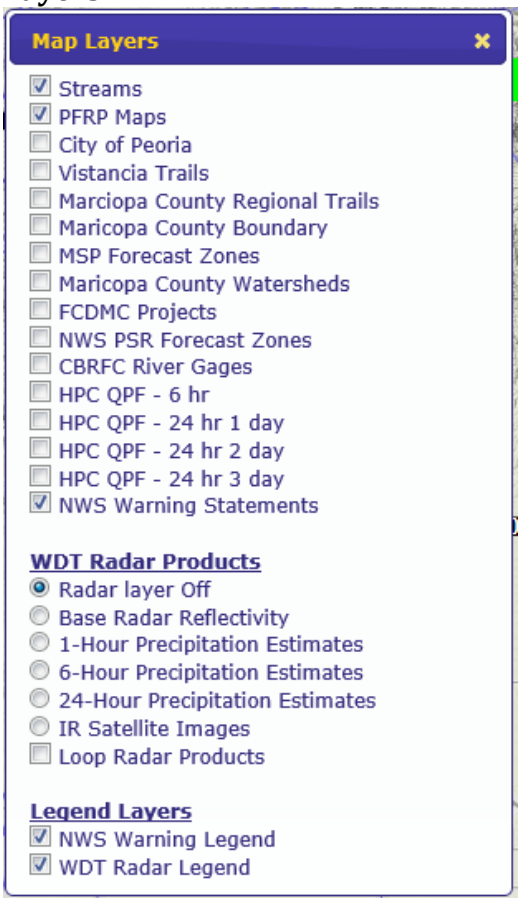


  - If you click on the markers for any of these datasets an "infowindow" will display. This window will show you the last time the gauge checked in, provide links relevant to the gauge, show a table of all the gauges sensors, and show a plot of the last 24 hrs. of data. You can move this infowindow to a different spot. You can click on a different gauge and the data will refresh. Once open click the "x" button to close the infowindow.



- 10 min rainfall – updates every 15 minutes
- 30 min rainfall – updates every 15 minutes
- 1 hour rainfall – updates every 15 minutes
- 3 hour rainfall – updates every 15 minutes
- 6 hour rainfall – updates every 15 minutes
- 1 day rainfall *default* – updates every 15 minutes
- 3 day rainfall – updates every 15 minutes
- 7 day rainfall – updates every 15 minutes
- Streamflow Data – displays current discharge (cfs), updates every 15 minutes
- Impoundment Data (Dams & Basins) – displays current % capacity, updates every 15 minutes
- Weather Data – updates every 15 minutes
- Air Quality AQI (Data from MCAQD) – updates every 1 hour
- Air Quality Weather Data (Data from MCAQD) – updates every 5 minutes

- **Layers**

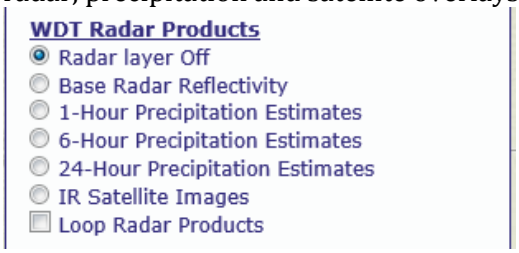


  - This section includes a variety of additional data that you can overlay on top of any Dataset you have chosen.

    - Streams *turned on by default* - If you click on the stream you will get an infowindow which displays the stream name.
    - PFRP Maps – This layers shows the four separate Peoria Flood Response Plan Zones defined in the PFRP and has links to the PFRP Maps with the Flood Conditions Boxes.
    - City of Peoria – Boundary of the City of Peoria

- Vistancia Trails – Trail system in Vistancia Community
- Maricopa County Regional Trail System
- County Boundary
- MSP Forecast Zones – Maricopa County Meteorological Forecast Zones used by District Meteorologist. Our daily weather outlook has a Precipitation Forecast by Zone. http://www.fcd.maricopa.gov/Rainfall/Weather/outlook.aspx
- Maricopa County Watersheds - If you click on any watershed you will get an infowindow which displays the name.
- FCDMC Projects – This layer shows all FCD projects in a polyline format. If you click on any projects you will get an infowindow which displays the project name.
- NWS PSR Forecast Zones – National Weather Service, Phoenix Office, Forecast Zones layer.
- CBRFC River Gauges – Colorado Basin River Forecast Center River Gauges. This layer will overlay a file which shows the location and status of the gauges. If you click on any gauge you will get and infowindow which displays more information and a link to the hydrograph.
- HPC QPF – 6hr, 24 hr 1day, 24 hr 2 day, 24 hr 3 day - displays the Hydrometeorological Prediction Centers' Quantitative Precipitation Forecast Data. When checked, colored polygons with predicted rainfall totals will be overlaid on the map.
- NWS Warning Statements *turned on by default* - this displays the most current NWS Warnings Layer. It will display a polygon wherever a Tornado, Severe Thunderstorm, or Flash Flood Warning is issued. The map auto refreshes this layer every 2 minutes if it is turned on.

➢ A company named Weather Decision Technologies, or WDT provides radar, precipitation and satellite overlays to the District for public display.



- Radar layer off *selected by default*
- Base Radar Reflectivity – this will add the latest radar layer. The timestamp of this radar product will be displayed in the blue data box at the top of the map.
- 1 –hr Precipitation Estimates – Gauge adjusted Precip Estimates, legend will display
- 6 – hr Precipitation Estimates – Gauge adjusted Precip Estimates, legend will display
- 24 – hr Precipitation Estimates – Gauge adjusted Precip Estimates, legend will display
- IR Satellite Images

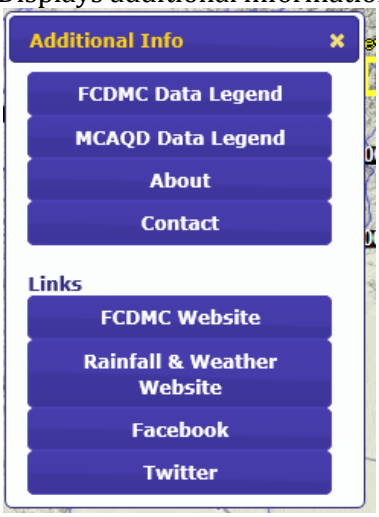
- Loop Radar Box – Once you click on the "Radar" button, check this box and your Base Radar Reflectivity will loop. The timestamp for all the layers will be displayed in the blue data box at the top of the map.
-

➢ NWS Warnings Legend *checked by default* - This will turn the legend off only. The layer will still be turned on if the NWS Warning Statements box is still checked above.

➢ WDT Radar Legend *checked by default* - This will turn off the WDT Radar Legends from displaying when viewing the WDT data.

- **Historic**
  - ➢ Displays historic rainfall data. Select a Month, Day, Year, time and time step need to be selected. The Update Map button will overlay the requested data onto the map.

- **Info**
  - ➢ Displays additional information.



- FCDMC Data Legend – Displays the Weather Legend & icon descriptions. This legend is moveable and resizable.
- MCAQD Data Legend – Displays AQI Index Legend & Current Weather Data legend. This legend is moveable and resizable.
- About – Includes Information, Sources and our Disclaimer
- Contact – Contact person and FCD Information

- FCDMC Website - http://www.fcd.maricopa.gov/index.aspx
- Rainfall & Weather Website - http://www.fcd.maricopa.gov/Rainfall/rainfall.aspx
- FCDMC Weather Outlook - http://www.fcd.maricopa.gov/Rainfall/Weather/outlook.aspx
- Facebook – Link to the Rainfall & Weather Facebook Page https://www.facebook.com/pages/Maricopa-County-AZ-Rainfall-Weather/136330769761403
- Twitter - https://twitter.com/FCDMaricopa

- **Refresh**
  - Refreshes whatever is on the page when you click on it. The map automatically updates everything every 2 minutes.

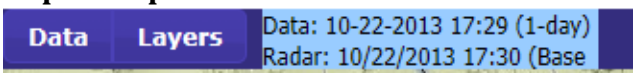
Mobile Map

There is a mobile version of the PFRP Online Google Map which will load automatically if you try to open up the Main map on any smartphone. The mobile map is a stripped down version of the desktop map. The mobile map geolocates the user, overlays 1 day rainfall values, overlays the NWS warnings, the WDT radar, and the Peoria Zones (Flood Conditions Maps) layer. This map will work on any smart phone (iPhone, Android, Windows). The only phone it will not work on is the older Blackberry phones because they have an outdated web browser that will not support the JavaScript code used in these maps. The map will work on a Blackkberry phone if it is a z10 model or newer. The direct link to this map is http://alert.fcd.maricopa.gov/alert/Google/v3/mobile_peoria.html.

Note: This map is using code that requires Internet Explorer 9 or better, Firefox, Chrome, or Safari. It will only work with IE8 if you install the Google Chrome Frame. Departments like the Police Dispatch will be able to view this map on their computers because they have one of the browsers listed above. Most people in the City will not be able to view this map on their desktop computer because they have IE8 without the Google Chrome Frame. If you are pulling this up on a smart phone, you don't have to worry about browser types.

Elements of the Peoria FRP Mobile Google Map

1. **Top of Map:**



- Menu Bar: Data and Layers. Once open click the "x" button to close the box.
- Data Description Bar: Includes Data Date, Time, Product and Radar Information. Radar is by default turned on.
- This map auto refreshes every two minutes updating the layers that are overlaid on the map.

2. **Map Icons:**
    - **M** means missing data, gauge hasn't reported in 6 hours or more.
    - **+** means there is 0.00"of rainfall (no measureable amount) reporting in the interval you chose.
    - If rainfall has occurred over the gage in the specified time interval, the amount will be displayed.
3. **Map Navigation:**
    - Navigate pages just as you would in Google Maps.
4. **The Menu:**
    - **Dataset**
        - All Rainfall Markers will display as black with white text. At 0.50" of rain text turns yellow, at 1.25" of rain text turns red, and at 2.00" of rain the markers turn white with red text.
        - If you click on the markers for any of these datasets an "infowindow" will display. This window will show you the last time the gauge checked in, provide links relevant to the gauge, show a table of all the gauges sensors, and show a plot of the last 24 hrs. of data. You can move this infowindow to a different spot. You can click on a different gauge and the data will refresh. Once open click the "x" button to close the infowindow.
            - 10 min rainfall – updates every 15 minutes
            - 30 min rainfall – updates every 15 minutes
            - 1 hour rainfall – updates every 15 minutes
            - 6 hour rainfall – updates every 15 minutes
            - 1 day rainfall *default* – updates every 15 minutes
            - 3 day rainfall – updates every 15 minutes
            - Streamflow Data – displays current discharge (cfs), updates every 15 minutes
            - Impoundment Data (Dams & Basins) – displays current % capacity, updates every 15 minutes
            - Weather Data – updates every 15 minutes
    - **Layers**
        - This section includes a variety of additional data that you can overlay on top of any Dataset you have chosen.
            - PFRP Maps – This layers shows the four separate Peoria Flood Response Plan Zones defined in the PFRP and has links to the PFRP Maps with the Flood Conditions Boxes.
            - County Boundary
        - A company named Weather Decision Technologies, or WDT provides radar, precipitation and satellite overlays to the District for public display.
            - Radar layer off
            - Base Radar Reflectivity – this will add the latest radar layer. The timestamp of this radar product will be displayed in the blue data box at the top of the map. *selected by default*
            - Loop Radar Box – Once you click on the "Radar" button, check this box and your Base Radar Reflectivity will loop. The timestamp for all the layers will be displayed in the blue data box at the top of the map. *selected by default*

- WDT Radar Legend *checked by default* - This will turn off the WDT Radar Legends from displaying when viewing the WDT data.

- National Weather Service
  - NWS Warning Statements *turned on by default* - this displays the most current NWS Warnings Layer. It will display a polygon wherever a Tornado, Severe Thunderstorm, or Flash Flood Warning is issued. The map auto refreshes this layer every 2 minutes if it is turned on.
  - NWS Warnings Legend - This will turn the legend on.

To access this map in one click, by adding a bookmark to your phones home screen:

For and iPhone, iPad, iPod Touch

Open up the mobile map in your phones browser:

1. Click OK if you are asked if the map can use your location
2. Click your share button 
3. Choose Add to Home Screen.

This will add an icon with the FCD Logo to your home screen that will open up the map in one click next time you want to view it.

Any questions or comments about this map can be sent to Chandra Miller at chandramiller@mail.maricopa.gov.